

KENYA COLONY AND PROTECTORATE



Department of Agriculture Annual Report 1934

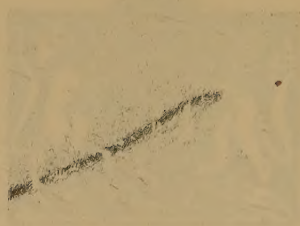
VOLUME I

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Department of Agriculture
Annual Report
1934

VOLUME I

TABLE OF CONTENTS

PART I.—ADMINISTRATION

PAGE

ANNUAL REPORT OF THE DIRECTOR OF AGRICULTURE	1
Appendix I—Staff List and Changes in Staff	23
Appendix II—Grading and Inspection Services	26
Appendix III—Kenya Rainfall, 1934	36

PART II.—PLANT INDUSTRY

REPORT OF THE DEPUTY DIRECTOR (PLANT INDUSTRY)	37
REPORT OF THE AGRICULTURAL OFFICER IN CHARGE CENTRAL PROVINCE	71
REPORT OF THE AGRICULTURAL OFFICER IN CHARGE NYANZA PROVINCE	88
REPORT OF THE AGRICULTURAL OFFICER IN CHARGE COAST PROVINCE	109

PART III.—ANIMAL INDUSTRY

REPORT OF THE DEPUTY DIRECTOR (ANIMAL INDUSTRY) AND CHIEF VETERINARY OFFICER	114
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Annual Report of the Department of Agriculture, 1934

VOLUME I

Part I.—Administration

ANNUAL REPORT OF THE DIRECTOR OF AGRICULTURE

The Annual Report for this year follows a somewhat different plan from that adopted in previous years and it is hoped that it will be found less cumbersome and more readable. The report is published in three volumes. Volume I is divided into three parts; the first consisting of my own report on agricultural progress during the year, the second and third of the reports of the Deputy Directors of Plant and Animal Industry on the work done by their divisions. Volume II consists of the full reports of the specialist and field staff of the Plant Industry Division on the investigational work done during the year; that is, the reports of the Entomological, Botanical, Chemical, Plant Breeding and Coffee sections, also reports on investigational work in the field by Agricultural Officers in both European and native areas. Volume III contains the reports of the investigational work of the Animal Industry Division, that is, the report of the Veterinary Research Laboratory, the Naivasha Farm and the report on improvement of native cattle by breeding.

FINANCIAL.

Statements of expenditure and revenue for the fiscal year under review are given below :—

EXPENDITURE	Amount Originally Sanctioned	Amount Expended
	£	£
“ A ” Administrative and General (including Total Cost of Headquarters Staff)	11,670	10,817
Grant to Kenya Agricultural Society	200	439
Contribution to Amani Institute	2,028	2,028
Contribution to Imperial Bureaux of Ento- mology and Mycology	450	450
*Contribution to Imperial Scheme for Agri- cultural Scholarships	324	—

*Transferred to Colonial Development Fund.

EXPENDITURE—(Contd.)	Amount Originally Sanctioned	Amount Expended
	£	£
Contribution to Colonial Agricultural Services	140	140
Contribution to Imperial Agricultural Bureaux	200	550
Expenses of Board of Agriculture and Committees	600	433
Grant-in-Aid to Sisal Industry	—	778
Contribution to Locust Research	500	502
Locust Campaign	—	3,462
"B" Division of Plant Industry	11,329	10,970
Subdivisions—		
Native Agriculture	16,443	15,964
Scott Agricultural Laboratories	10,695	10,648
Plant Breeding Services	3,139	3,094
Grading, Conditioning, etc.	5,059	4,316
"C" Division of Animal Industry, Administrative	7,985	7,914
Subdivisions—		
Veterinary Services (Executive)	14,347	13,994
Veterinary Research	21,625	22,099
Animal Husbandry	758	655
Native Services	19,807	19,254
Rabies Campaign	100	130
International Veterinary Congress	—	166
	£ 127,399	128,803

Not taking into account expenditure on locust destruction and rabies, the expenditure of the Department was £1,093 more than the net expenditure for 1933.

As shown in the following detailed statement, revenue amounted to £20,145 compared with an estimated sum of £14,350 :—

REVENUE	Original Estimates	Actual Receipts
	£	£
Grading, Conditioning and Cold Storage Fees, etc.	3,000	2,457
Fees from Agricultural Chemical Laboratory	100	56
Sale of Farm Produce and Stock	700	777
Sale of Stores	50	62
Veterinary Inoculation Fees, etc.	7,500	12,553
Sale of Sera, Vaccines and Laboratory Products	3,000	4,240
	£ 14,350	20,145

Revenue collected in 1934 showed an increase of £2,733 over the amount collected in 1933.

WEATHER.

The rainfall for the year was some 30 to 40 per cent below average in most districts, an exception being the coastal strip where it was above normal. The precipitation was badly distributed, being above normal in May, June and July and below normal during the remainder of the year.

GENERAL AGRICULTURAL CONDITIONS.

In consequence of the drought, crops and live stock were adversely affected, with prices on the overseas markets showing little or no improvement. The year on the whole was a difficult one for most classes of producers.

Though the movement is seriously handicapped by a lack of funds there is a definite and marked tendency towards mixed crop and live stock farming. This is regarded as a development to be encouraged, both in European and in native areas, as a means of augmenting the income of farmers, spreading the risks, conserving the fertility of the soil and, in native areas, improving the dietary of the population. At the same time, stock farmers in pastoral areas are realizing the value of arable crops grown for supplementary live stock food.

EXPORTS.

The total value of agricultural exports was £1,602,212, a decrease of £299,717 from the preceding year. The chief decreases were in respect of coffee £349,010, maize £98,005 and sesame seed £20,599 : total £467,614. The chief increases were in respect of sisal £61,403, hides £36,447, tea £35,395, wattle £13,605 ; total £146,850. The great reduction in quantity and value of exports of coffee during the year is largely accounted for by the lateness of the crop so that much of it was not ready for export until 1935 ; this will be reflected in the exports for that year. The value was further reduced by a fall in prices. The reduction in the acreage under maize in 1933 was largely responsible for the fall in exports in 1934.

The following table shows the exports of the principal commodities over the past five years :—

	1934			1933			1932			1931			1930		
	Quantity	Value		Quantity	Value		Quantity	Value		Quantity	Value		Quantity	Value	
Animals, Living ..		£ 7,376			£ 2,616			£ 4,825			£ 5,499			£ 8,709	
ANIMAL PRODUCE															
Butter ..	11,330	41,266		7,514	27,268		9,242	40,604		6,325	35,618		7,798	53,065	
Hides.. ..	100,651	168,550		91,733	132,103		53,506	87,067		34,848	63,354		46,066	115,112	
	No.			No.			No.			No.			No.		
Skins, Sheep and Goats ..	979,585	26,089		960,610	20,496		524,329	16,167		932,285	36,870		1,709,155	66,131	
	Cwt.			Cwt.			Cwt.			Cwt.			Cwt.		
Wool ..	8,951	30,037		8,330	38,481		8,503	39,293		7,784	43,427		8,335	70,615	
Other Animal Produce		29,854			34,118			36,185			26,848			25,292	
CROP PRODUCE															
Coffee ..	187,017	493,343		257,214	832,353		276,041	1,214,392		245,991	986,988		310,168	1,427,536	
Cotton ..	10,490	28,483		9,600	23,584		4,032	8,589		2,795	6,588		5,421	17,657	
Sisal ..	480,320	311,371		397,000	249,868		307,700	186,575		319,880	232,564		318,980	437,269	
Maize and Maize Meal	530,853	130,509		1,156,473	218,514		520,543	119,133		1,879,824	425,041		2,294,135	586,851	
Wheat ..	2,004	591		118	50		1,727	525		63,644	15,313		214,527	91,447	
Wheat Flour ..	47,421	30,603		41,076	25,158		30,221	18,777		28,082	20,263		38,537	33,150	
Sesame Seed ..	30,580	16,162		64,840	36,761		45,400	28,535		9,720	5,347		22,600	15,287	
Potatoes ..	40,445	9,170		51,192	10,704		68,130	15,386		49,723	13,258		45,018	11,138	
Sugar.. ..	73,364	57,781		82,644	66,963		16,046	17,879		21,709	24,930		15,683	19,899	
Tea ..	22,115	112,062		17,462	76,667		6,252	29,262		3,158	16,795		1,432	8,192	
Wattle Bark and Extract ..	308,311	80,369		244,840	66,764		246,354	85,866		198,441	73,231		147,889	63,080	
Other Crop Produce		28,596			39,461			28,346			31,307			59,897	
TOTAL VALUE .. £		1,602,212			1,901,929			1,977,406			2,063,241			3,110,327	

AGRICULTURAL STATISTICS.

It was decided to take the Agricultural Census biennially instead of annually as formerly, and no census was taken in 1935. In consequence, statistical information in regard to agriculture in 1934 is limited to that available from the bi-monthly crop reports and from records in the Customs Department, with certain minor sources for individual products. Some tables therefore giving figures of production over a number of years have been omitted from this report as there is nothing to add to them but an estimated figure.

CROP AND STOCK REPORTS.

Coffee.

The coffee crop was again poor due to the abnormal climatic conditions. The yield was estimated in January at 234,400 cwt. Exports during the crop year July 1st 1934 to June 30th 1935 amounted to 239,752 cwt. equivalent to 2.33 cwt. per acre of coffee of all ages. This is the lowest value declared since the quality was seriously impaired by the drought conditions.

Partly in consequence of the reduction in quality a smaller proportion of this crop was consigned to the United Kingdom. In 1934 only 45 per cent was so consigned, as compared with 64 per cent in 1933. The corresponding proportion for the crop year 1934-35 was 51 per cent. Notable increases occurred in shipments to the United States, Canada and South Africa.

Average prices in London during the early months of the year, when the bulk of the Kenya crop is sold, were on a considerably higher level than in 1934 the preceding year. A further advance was registered in January and February 1935, but after the latter month prices fell away.

The weighted average prices realized for Kenya coffee are shown in the following table :—

SHILLINGS PER CWT.

	1935	1934	1933	1932
January	80	60	73	108
February	84	74	67	106
March	73	79	62	93
April	66	70	57	75
May	54	65	56	66
June	38	52	59	58
July	—	56	57	60
August	—	52	55	64
September	—	64	57	82
October	—	40	54	75
November	—	54	62	72
December	—	57	58	71

The all-over weighted average was Sh. 70 per cwt. for the 1934-35 crops as against Sh. 67 for the 1933-34 crop and Sh. 67 for the 1932-33 crop. In this connection, however, it has to be noted that the London average price was maintained largely owing to a larger proportion of the poorer qualities being consigned to other markets.

Arrivals in the United Kingdom of Kenya coffee, re-exports and quantities retained for home consumption, as given by H.M. Commissioner, E.A. Trade and Information Office, London, were as follows :—

July to June inclusive :—

			Imports into United Kingdom	Re-exports	Retained
			<i>Cwt.</i>	<i>Cwt.</i>	<i>Cwt.</i>
1932-3..	..	..	259,289	113,032	146,257
1933-4..	..	..	165,358	33,922	111,436
1934-5..	..	..	122,880	23,303	99,577

Sisal.

Production of sisal fibre continued to expand and exports during the calendar year 1934 amounted to 24,016 tons, valued at £311,371 as compared with 19,850 tons valued at £249,868 in 1933. The London price of No. 2, which rose from about £14 per ton at the beginning of 1933 to about £18 at one period of the year had dropped to £14 by August 1934, from which point it recovered but slightly by the end of the year.

Maize.

The area of maize harvested was estimated at 123,155 acres, as compared with 112,449 acres in 1933-34. The production was estimated at 969,486 bags or 7.9 bags per acre, compared with an actual crop of 746,893 bags or 6.62 bags per acre according to the Agricultural Census 1934. The high average yield despite the unfavourable climatic conditions experienced, reflects the large degree of improvement which has been taking place during the past few years in the standard of husbandry practised by maize farmers. No small part of this improvement is due to the results of the investigational work and propaganda in connection with improved cultural methods and seed selection carried out by the Department. The pool

price on the 1934 crop was declared by the Kenya Farmers' Association at Sh. 5/68 per bag f.o.r. main line and was greatly helped by substantial sales to Canada at a figure above export parity.

Exports of maize amounted to 439,958 cwt. valued at £104,754 as compared with 1,131,549 cwt. valued at £212,699. In addition 90,898 cwt. of maize meal valued at £25,755 were exported during the year. It should be understood that these figure as well as the grading statistics which follow refer to the crop grown in the previous year. The fall in exports in 1934 compared with 1933 is accounted for both by the greatly reduced acreage under the crop in 1933 in European areas and by the drought in some native reserves necessitating the larger use than usual of the European grown crop for local requirements.

The position as regards weevil infestation and dryness will be seen from the following statistics.

STATEMENT OF MAIZE PRESENTED DIRECT FOR GRADING AT THE COAST

YEAR	Total Received	Total Graded	Slightly Weevily	Percent-age Slightly Weevily	Total	REJECTED		Other Causes
						Wet and Musty	Weevily	
	<i>Bags</i>		<i>Bags</i>	<i>Per cent</i>	<i>Bags</i>	<i>Bags</i>	<i>Bags</i>	<i>Bags</i>
1934	205,826	197,324	30,347	14.8	8,502	1,686	4,325	2,491
1933	458,775	411,974	80,457	17.5	46,801	41,719	1,195	3,887
1932	289,503	250,007	62,229	21.5	39,496	25,814	7,711	5,971
1931	1,031,704	904,662	161,218	15.6	127,042	55,005	61,003	11,034
1930	1,022,086	618,092	196,643	19.2	403,994	300,354	71,840	31,800

Almost all the maize rejected as wet was subsequently graded K.2 after being treated at the conditioning plant. As regards condition of the maize received it will be seen that the harvest season in 1933 was relatively favourable.

46,552 bags of maize were shipped without export certificates to ports north of Beira, south of Port Said and to the Arabian coast.

Wheat.

The area harvested was estimated at 42,682 acres, the total yield at 180,205 or 4.2 bags per acre, and no wheat had

to be imported, the Colony becoming once more self-supporting. The corresponding figures for the previous season were 35,001 acres yielding 145,581 bags or 4.2 bags per acre.

The Sale of Wheat Ordinance continues to work satisfactorily. The price paid by the mills to the Agency for first grade wheat was Sh. 19/50 per bag of 200 lb. f.o.r. As in previous years rebates were allowed in respect of wheats milled for consumption on the Coast, in Tanganyika and the Belgian Congo. The net pool price to growers for first grade wheat was thus reduced to Sh. 15/11 per bag.

Exports of wheat in the grain were small, amounting to only 2,004 cwt. Exports of flour increased to 47,421 cwt. valued at £30,603 from 41,076 cwt. valued at £31,158 in 1933. These figures refer to the crop grown in the previous year.

Tea.

The production of prepared tea during the year ending 28th February, 1935, was 4,478,838 lb. as compared with 3,063,687 lb. in 1933-34 and 2,421,056 lb. in 1932-33.

Exports of tea during the last three years have been as follows :—

1934	...	22,115 cwt. valued at £112,062.
1933	...	17,462 cwt. valued at £76,667.
1932	...	6,252 cwt. valued at £29,262.

Towards the end of the year the International Tea Restriction Scheme was applied to the Colony. Under the Tea Restriction Ordinance 1934 further planting was restricted during a space of five years from the passing of the Ordinance to a maximum of 1,000 acres. The rate of increase of production will therefore decline as the plantations approach maturity.

Cotton.

The following table shows the output of seed cotton and total quantity of lint ginned for the years 1930 to 1934. A steady increase in production is disclosed in both the Nyanza and Coast provinces and the production this year constitutes a record for Kenya. Surveys of possible areas for cotton growing show that there are suitable areas in Kitui, Lower Embu and Fort Hall and it is hoped to make a start with cotton growing in these districts in 1934. Similarly in Nyanza Province a greatly increased acreage could be put under cotton, which is the staple cash crop for natives at the lower elevations.

COTTON—BUYING AND GINNING RETURNS

(THE COTTON INCLUDED IN THESE RETURNS IS ALMOST ENTIRELY OF NON-EUROPEAN CULTIVATION)

SEASON AND PROVINCE	TOTAL QUANTITY OF SEED COTTON PURCHASED			TOTAL QUANTITY OF LINT GINNED						TOTAL
				Roller Ginned		Saw Ginned		Total		
	"A" Quality	"B" Quality	"A" Quality	"B" Quality	"A" Quality	"B" Quality	"B" Quality	"A" Quality	"B" Quality	
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
1934-5:										
Total .	9,100,270	2,537,521	11,637,791	2,796,940	712,705	—	2,796,940	2,796,940	712,705	3,509,645
Coast .	872,107	1,312,205	2,184,312	266,641	360,502	—	266,641	266,641	360,502	627,143
Nyanza .	8,228,163	1,225,316	9,453,479	2,530,299	352,203	—	2,530,299	2,530,299	352,203	2,882,502
1933-4:										
Total .	7,315,324	990,277	8,305,601	2,413,957	280,444	—	2,413,957	2,413,957	286,044	2,700,001
Coast .	1,034,709	414,510	1,449,219	311,605	112,026	—	311,605	311,605	112,026	423,631
Nyanza .	6,280,615	575,767	6,956,382	2,102,352	168,418	—	2,102,352	2,102,352	174,018	2,276,370
1932-3:										
Total .	4,977,509	606,602	5,584,111	1,508,812	178,352	—	1,508,812	1,508,812	201,961	1,710,773
Coast .	1,229,494	199,826	1,429,320	356,854	54,220	—	356,854	356,854	66,074	422,928
Nyanza .	3,748,015	406,776	4,154,791	1,151,958	124,132	—	1,151,958	1,151,958	135,887	1,287,845
1931-2:										
Total .	2,306,518	440,882	2,747,400	676,586	382	—	676,586	676,586	17,597	694,183
Coast .	570,946	56,949	627,886	174,145	—	—	174,145	174,145	17,215	191,360
Nyanza .	1,735,572	383,942	2,119,514	502,441	382	—	502,441	502,441	382	502,823
1930-1:										
Total .	958,352	33,654	992,006	308,857	6,557	—	308,857	308,358	10,025	313,383
Coast .	43,909	15,640	59,549	17,821	1,513	—	4,981	12,322	4,981	17,303
Nyanza .	914,443	18,014	932,457	291,036	5,044	—	—	191,036	5,044	296,080

Sugar.

The production of sugar during the year ending 28th February, 1935, was 171,990 cwt. as compared with 112,980 cwt. in 1933-34 and 106,320 cwt. in 1932-33.

Exports during 1934 amounted to 73,364 cwt. valued at £57,781 as compared with 82,644 cwt. valued at £66,963 in 1933.

Wattle.

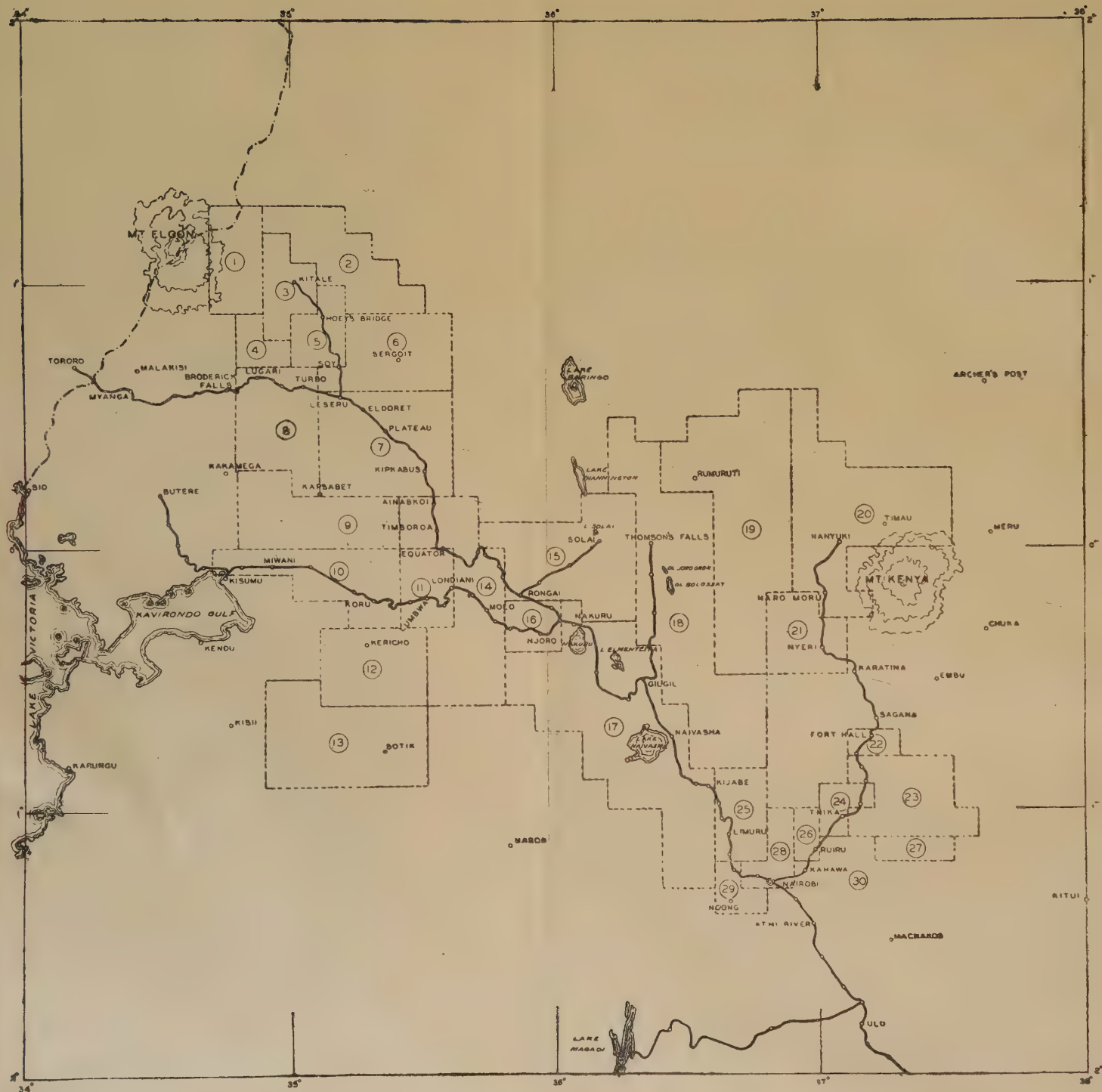
The production of wattle continued to expand in native reserves and forms a valuable cash crop for the higher elevations. In former years planting of wattle was confined almost entirely to the Central Province. Efforts are now being made to extend planting into the Nandi Reserve and the Kisii highlands. Considerable attention has been directed to the subject by European farmers in the western districts, stimulated doubtless by the demand for poles for mining purposes.

A new extract factory was established at Thika and an increasing proportion of the bark is being marketed in the form of extract. This is shown in the following export statistics:—

			BARK		EXTRACT	
			Quantity	Value	Quantity	Value
			<i>Cwt.</i>	£	<i>Cwt.</i>	£
1934	..	..	258,577	51,658	49,734	28,711
1933	..	..	216,081	46,614	28,759	20,150
1932	..	..	236,545	78,811	9,809	7,055

Pyrethrum.

Many farmers at the higher elevations are putting small acreages under pyrethrum which appears to be a promising crop if labour is plentiful and obtainable when wanted. Yields per acre are good (five to ten cwt.) in suitable districts and the increased percentage pyrethrin content over that in pyrethrum from other sources should enable Kenya to obtain a secure foothold in overseas markets. Pyrethrin is the toxic element in quick acting insecticides and there is a market for some 5,000 ton of pyrethrum flowers annually. A Pyrethrum Growers' Association has been formed for the purpose of organizing this promising new industry as considerable care has to be exercised in suitably preparing the flowers for export if a highly competitive market is to be entered successfully.



Crop Reports.

During the year a new system of drawing up crop estimates was inaugurated. It was considered that the method of tabulation by administrative districts might in certain circumstances give rise to an error in estimation by reason of the fact that areas of incompatible climate—geographical conditions were comprised within individual administrative districts. The crop-reporting area was divided into regions based on similarity of natural conditions. In indexing farms under this new system a meridional basis was adopted, bringing the system into line with that used by the East African Meteorological Service, so that correlation of agricultural with meteorological statistics will be possible.

The geographical divisions adopted are shown in the accompanying map, the key to the divisions being as follows :—

ZONE		
1. Elgon	11. Lumbwa	21. Nyeri
2. Cherangani	12. Kericho	22. Maragua
3. Kitale	13. Sotik	23. Makuyu—Ithanga
4. Kiminini	14. Mau	24. Thika
5. Hoey's Bridge	15. Rongai-Solai	25. Upper Kiambu
6. Soy-Sergoit	16. Njoro	26. Ruiru
7. Plateau	17. Rift Valley	27. Donyo Sabuk
8. Kipkarren	18. Aberdares	28. Kiambu
9. Nandi-Kaimosi	19. Laikipia	29. Ngong
10. Lake	20. Nanyuki	30. Machakos

The Agricultural Census Reports are being similarly indexed, though it is proposed at the same time to maintain continuity with the statistics hitherto published. The new system should materially increase the amount of economic information which can be obtained through the Census.

Animals and animal produce.

The year again was an exceedingly difficult one for stock-owners. Not only did the drought have serious effects on production and cause heavy losses of stock in pastoral native reserves, but price levels remained low and markets restricted.

Nevertheless, distinct progress was made in some directions. In the settled areas paddock and boundary fencing has been extended without the assistance of the Fencing Ordinance, which for financial reasons has not yet been applied.

Although no assistance was given for the importation of pure-bred stock the following pure-bred cattle were imported during the year :—

			Bulls	Heifers
Ayrshires	..	..	5	4
Jerseys	..	..	8	—
Shorthorns	..	..	4	1
Red Poll	..	..	3	2
Friesian..	..	..	2	—
TOTAL			..	29

The total is an increase of nine over the figure for the preceding year.

67 sheep, 80 Merino and 53 Romney Marsh rams were imported with 10 Romney Marsh ewes. This makes a total of 143, as compared with only 20 in the preceding year.

Butter production.

During the year an additional creamery was opened at Thomson's Falls by the Kenya Co-operative Creamery, Ltd., and considerable progress was made towards the establishment of a further creamery at Eldoret.

Statistics of creamery production during the last three census years are as follows :—

YEAR	SUPPLIES RECEIVED FROM FARMERS AND USED FOR MANU- FACTURING PURPOSES		PRODUCTS MANUFACTURED THEREFROM		
	Milk	*Butterfat	Butter	Cheese	Ghee
	<i>Gallons</i>	<i>lb.</i>	<i>lb.</i>	<i>lb.</i>	<i>lb.</i>
1934-5 ..	131,023	1,495,877	1,668,900	127,602	98,856
1933-4 ..	90,011	1,113,656	1,235,019	124,922	55,822
1932-3 ..	71,995	1,243,356	1,428,471	92,938	26,404

*Includes some milk paid for on a butterfat basis.

(Note.—The above figures differ from those given in previous reports owing to the elimination from the table of milk and cream sold as such.)

The pay-out made by the Co-operative Creamery for first-grade butterfat has been as follows :—

Year ending—

June 30th, 1933	...	Cents 73.10 per lb.
June 30th, 1934	...	Cents 66.50 per lb.
June 30th, 1935	...	Cents 57.05 per lb.

Exports of butter during the last three years have been as follows :—

			<i>Cwt.</i>		<i>£</i>
1934	...	...	11,330	...	41,266
1933	...	...	7,514	...	27,268
1932	...	...	9,242	...	40,604

London remains the main marketing centre and it is a matter for congratulation that prices comparable with those of the best qualities of Empire butter have been realized. Neighbouring territories in East Africa provide a market for increasing quantities, but some markets which might otherwise be available are inaccessible owing to absence of adequate and regular cold storage space on ships plying between these markets and Mombasa.

Cheese production.

The total production of cheese in the Colony is estimated at about 200,000 lb. The export trade in cheese is small and confined to neighbouring territories. The quality and variety of cheeses available on the local market continues to improve and the gourmet can now avail himself of a wide choice embracing Cheddar, Cheshire, Edam, Crustless, Cream Cheeses, Gorgonzola and other varieties, of excellent quality.

Ghee.

The production of ghee continues to expand, though as yet the Colony is on balance an importer of this product. The following figures indicate the output during the year from the more productive districts :—

					Quantity	Approximate Value
					<i>lb.</i>	<i>Sh.</i>
South Kavirondo	..	..	..	..	784,000	274,470
Central Kavirondo	..	..	..	..	257,160	97,435
North Kavirondo	..	..	..	..	62,920	23,840
Northern Frontier District and Tana River					46,697	26,803

Ghee production can be expanded very considerably and in suitable areas such expansion would constitute a profitable method of utilizing native cattle. In the event of any such expansion, however, it would be necessary to find external markets for the surplus and for some years past the possibility of finding export markets has been explored. From the knowledge acquired there appears to be no doubt that an export trade could be established.

The price of milk was standardized for dairies in Central Kavirondo at cents 2 per pint, at which rate it is possible to produce ghee at Sh. 12/50 per tin of 40 lb.

During the year considerable quantities of butterfat were sent from native reserves in the Nyanza Province to the Co-operative Creamery at Lumbwa. The movement has experienced a set-back, however, owing to the fact that much organization and educational work must be done before cream can be produced by natives consistently up to full grade. When much of the cream is graded as third grade the return falls below that for ghee and the creamery supply ceases.

Cattle for slaughter.

During the year cattle were slaughtered for consumption in municipalities as under :—

	Adult Cattle	Calves
Nairobi	14,795	702
Mombasa	6,031	
Eldoret	1,344	
Kitale	1,226	
Kakamega	1,712	

By the Nairobi figure 10,264 represented native cattle and 4,531 grade cattle. As compared with the preceding year the grade cattle showed an increase and the native cattle a decrease.

It is impossible to estimate the number of cattle slaughtered for meat within native reserves, but the figure must be considerable. The following cattle movements were recorded, but these probably represent only a part of the movements which have actually taken place :—

	Head
Via Lamu to Zanzibar	407
From Central Kavirondo to Uganda	6,991
From South Kavirondo to Tanganyika to the Markets of Central and North Kavirondo	16,174
Ex North Kavirondo	1,148
Ex Nandi Reserve	4,785
Ex Machakos Reserve	3,525
Ex Masai Reserve (Mainly to Nairobi)	8,957
N.F.P. via Tana River and Lamu	969
Coast Province and Tana River District	1,976

These movements represent only a small fraction of the estimated figure of 300,000 surplus cattle per annum. The existence of this surplus presents a yet unsolved problem. During the year a scheme was evolved for the erection of a by-product plant in the neighbourhood of certain native reserves in the Rift Valley Province and an application was made for assistance from the Colonial Development Fund. The proposed scheme was designed to deal with 10,000 head per year and though this number seems insignificant in relation to the total surplus the scheme would indicate how far the method is applicable to the solution of the position generally.

Sheep.

The dry weather was fairly well suited to wool sheep husbandry. Exports of wool during the year amounted to 8,952 cwt. valued at £30,037 as compared with 8,330 cwt. valued at £38,481 in 1933. At the London sales Kenya wool realized prices as under :—

						Highest Price	Lowest Price
						<i>Pence</i>	<i>Pence</i>
1st Series	2-2-34	..	..	..		18	11
2nd	16-3-34	..	..	..		17	13 $\frac{3}{4}$
3rd	11-5-34	..	..	..		13 $\frac{1}{2}$	10
4th	12-7-34	..	..	..		Average 9	—
5th	18-9-34	..	..	..		9	7 $\frac{1}{4}$
6th	11-12-34	..	..	..		9 $\frac{1}{4}$	6 $\frac{3}{4}$

Slaughterings in certain municipalities during the year were as follows :—

					Sheep	Goats	Sheep and Goats
Nairobi	..	..	..	..	8,288	21,594	29,882
Mombasa	..	..	..	..	—	—	25,311
Nakuru	..	..	..	..	—	—	1,181
Eldoret	..	..	..	..	—	—	1,281
Kitale	..	..	..	..	—	—	695
Kakamega	..	..	..	..	—	—	862

During 1934, 57,860 sheep and goats were passed through Isiolo and 4,600 through Mkowe (the quarantine station for Lamu). Most of the sheep passed through Isiolo are driven

by licensed traders and practically all, after disposal in the Kikuyu markets, are slaughtered for meat. Approximately 35,000 head were passed through Kijabe and 2,188 through Ngong. These come mainly from the Masai district and supply the native markets in Nairobi and the Kikuyu markets in the neighbourhood. Machakos and Kitui are other large "exporting" areas supplying Nairobi and the Southern Kikuyu districts. The number of sheep and goats passed out during the year was 37,235.

Pigs.

Pigs slaughtered in Nairobi numbered 1,959, in Nakuru 247, and in Eldoret 319. No Agricultural Census having taken place, the number supplied to other centres and to bacon factories is not known.

Arrangements were made whereby pigs could be railed direct to Uganda, instead of being railed to Kisumu and shipped thence via the Lake, as was formerly the system in use.

Poultry.

During the year there was a shortage of eggs due to a falling off in production and to improved marketing arrangements which caused an increase in demand by steamers calling at Mombasa and by the trade generally.

Deliveries of members of the Kenya Poultry Club totalled 33,306 dozen, as against 36,673 dozen in 1933.

At the end of 1933 a shipment of 3,030 dozen eggs was made to London but the net return was only cents 37 per dozen. This compares unfavourably with the Sh. 1 and cents 75 advanced to members for Specials and Standards respectively.

The year marked a distinct advance in marketing organization. The members of the Circles agreeing, by an overwhelming majority, on voluntary co-operation.

The native poultry industry, though a promising one, has received little stimulation apart from the distribution of pure-bred cockerels. The Rhode Island Red appear to be the breed most favoured and most suitable under the ordinary conditions of native poultry husbandry.

Hides and Skins.

Exports of hides and skin reached a higher value than in any year since 1929. Exports of sheep and goat skins showed an increase over the preceding year. The statistics for the last four years are given below :—

		HIDES		SKINS (Sheep and Goat)	
		<i>Cwt.</i>	£	<i>No.</i>	£
1934	..	100,651	168,550	979,585	26,089
1933	..	91,733	132,103	960,610	20,498
1932	..	53,506	87,067	524,329	16,167
1931	..	34,848	63,354	932,285	36,870

The spread of the practice of shade-drying hides continues, particularly in the more thickly peopled areas. In North, Central and South Kavirondo there are now over one hundred shade-drying sheds and development is also proceeding in certain areas of the Central and Coast Provinces and to a lesser extent over all the native areas except the Northern Frontier and Turkana districts.

The Hides and Skins Rules under the Live Stock and Crop Production Ordinance were applied during the year to Central Kavirondo, South Kavirondo and Machakos Reserves.

A useful report upon experiments on the preparation of hides and skins was received from the Imperial Institute.

BOARD OF AGRICULTURE.

During the year three meetings each were held of the full Board, the Animal Industry Standing Committee and the Plant Industry Standing Committee. The cost to Government of the Board amounted to approximately £442 out of £600 sanctioned and included the salary of a stenographer and travelling expenses and allowances of members of the Board.

The deliberations and advice of the Board were of considerable value to the Department and to Government and amongst the more important matters discussed were the following: Compulsory Co-operative Marketing of Dairy Produce; increase of the cess under the Butter Levy Ordinance; provisions of the Resident Native Labourers Bill; control of squatter stock; deterioration in quality of maize for export; storage of maize; legislation to control the pyrethrum industry; application of the Fencing and Cattle Cleansing Ordinances; overstocking on unalienated Crown land; Noxious Weeds Ordinance; prevention of soil erosion; afforestation; frequency of taking the agricultural census and of submitting crop reports.

The Coffee Board, of which the Director and Deputy Director (Plant Industry) are members, and the Wheat Advisory Board continued to render valuable services on behalf of the coffee and wheat industries.

ROYAL AGRICULTURAL AND HORTICULTURAL SOCIETY OF KENYA.

A very successful Agricultural Show was held at Nakuru on December 6th and 7th, at which both the Animal and Plant Industry Divisions of the Department staged informative and instructive exhibits illustrative of the work in hand on agricultural problems; a feature was also made of exhibits of agricultural progress and development in native reserves. The participation of the Department in Agricultural Shows is regarded as a valuable means of acquainting the public with its work and of maintaining contact between the officers of the Department and the farming community who visit the departmental exhibits.

The Society again organized Maize Seed Competitions in co-operation with the Department of Agriculture. These competitions are becoming popular amongst maize growers and greatly benefit from the support given them by the Kenya Farmers' Association also. Every entrant's seed is put to a real test of productivity in the field in competition with that of the other entrants and a steady improvement in quality of seed is resulting.

Volume VI of the East African Stud Book was published by the Society in October and represents a very considerable advance in the number of entries over previous volumes. As indicated in last year's report an amended Milk Recording Scheme has been devised. The scheme is receiving a fair measure of support and will come into operation in 1935; though not perfect owing to financial limitations it is a practical effort to render an important service in the development of the dairy industry.

A great effort was made during the year to improve the finances of the Society which was in grave danger of having to close down unless the necessary income for the year, amounting to £1,400, was assured by June 30th. The services of the Society to the agricultural industry are invaluable but the effect of the financial depression has been to endanger its existence. The appeal for support by the Society met with a considerable measure of success both from Government and

the public and it is now out of immediate danger. Government continued its ordinary grant-in-aid of Sh. 3,000 but agreed it should be credited to the General Income and Expenditure account instead of to the Building fund. In addition, in response to representations, Government made a supplementary grant-in-aid on the basis of £1 for £1 in respect of the amount of Member's subscriptions received in 1934 in excess of the aggregate subscriptions for 1933. The funds benefited in this way to the extent of Sh. 4,768/50. Further, Government contributed Sh. 1,000 as an ex gratia refund in respect of Entertainment Tax deducted from the profits of a Searchlight Tattoo held in 1933. The grants-in-aid given by Government amounted therefore to Sh. 8,768/50.

THE LAND AND AGRICULTURAL BANK OF KENYA.

The operations of the Land and Agricultural Bank of Kenya during the year 1934 are recorded in the Annual Report submitted to His Excellency the Governor. Copies may be obtained from the Government Printer, Nairobi.

During the year the Land and Agricultural Bank (Amendment) Ordinance No. IV was passed. This Ordinance empowers the Board to make Short Term advances up to a maximum of £500 for such purposes as may be prescribed by the Governor-in-Council, the maximum period for repayment being three years. It also provides for advances to co-operative societies and for the waiving of priority by a mortgagee in favour of the Bank by means of a simple instrument under his hand.

During 1934, 141 applications were received for long term advances aggregating £186,170, and 40 applications aggregating £75,045, were brought forward from the previous year, making a total of 181 applications aggregating £261,215. In addition 24 applications for short term loans, aggregating £6,140, were dealt with.

Total advances of £166,365 to 144 applicants were approved and 12 short term loans, amounting to £2,340 were granted.

Administrative expenses for 1934 amounted to 1.03 per cent of the capital invested and, as a result of the year's operations, a sum of £5,016/14/52 was carried to Reserve Account.

The scheme of inspections instituted in 1933 was maintained in 1934 and during the year 222 inspections were made. The cost of these inspections is borne wholly by the Bank

and, though this forms a major item in the cost of administration, the expense, though considerable, is held to be amply justified.

The purpose to which advances have been allocated are classified as under :—

	<i>Per cent</i>
Discharge of existing mortgages ...	46.2
Permanent improvements ...	21.8
Purchase of land	18.1
Purchase of stock	4.8
Farming operations	7.7
Purchase of machinery and implements	1.4
	100.0

GRADING AND INSPECTION SERVICES.

The full report on these services by the Chief Grader and Inspector appears as Appendix II to this report. The statistics contained in this report provide a valuable record of the quality of the crops, maize, potatoes and beans, graded prior to export and of the use made of the Cool Stores.

AGRICULTURAL LEGISLATION, 1934.

The following legislation affecting agricultural industries was promulgated during the year :—

Ordinances.

Agricultural Advances (Amendment) Ordinance, 1934.

Agricultural Mortgagors' Relief Ordinance, 1934.

Coffee Industry Ordinance, 1934.

Cotton (Tax) (Amendment) Ordinance, 1934.

Diseases of Animals (Amendment) Ordinance, 1934.

Land and Agricultural Bank (Amendment) Ordinance, 1934.

Land and Agricultural Bank (Amendment No. 2) Ordinance, 1934.

Sisal Industry Ordinance, 1934.

Sugar (Amendment) Ordinance, 1934.

Tea Ordinance, 1934.

Rules and Orders.

Under the Agricultural Produce Export Ordinance (Cap. 98 of the Revised Edition).

Grading of Maize (Amendment) Rules, 1934.

Grading of Maize (Amendment No. 2) Rules, 1934.

Agricultural Produce Export (Potato) (Amendment) Rules, 1934.

Under the Branding of Stock Ordinance (Cap. 159 of the Revised Edition).

Branding of Stock Rules, 1934.

Under the Cotton (Tax) Ordinance (Cap. 60 of the Revised Edition).

Tax Payable in Certain Provinces for 1934.

Under the Diseases of Animals Ordinance (Cap. 157 of the Revised Edition).

Diseases of Animals (Amendment) Rules, 1934.

Diseases of Animals (Amendments Nos. 2, 3 and 4) Rules, 1934.

Conditions of Issue of Permits for Movement of Certain Animals.

Under the Diseases of Plants Prevention Ordinance (Cap. 155 of the Revised Edition).

Diseases of Plants Prevention (Oriental Fruit Moth) Rules, 1934.

Diseases of Plants Prevention (Coffee) Rules, 1934.

Under the Sisal Industry Ordinance, 1934.

Fixation of Rate of Levy (5 cents per cwt.).

Under the Crop Production and Live Stock Ordinance, 1926.

Agricultural Produce (Nyanza Province) Marketing Rules, 1934.

Native-Grown Coffee Rules, 1934.

Agricultural Produce Marketing Rules, 1934.

Wattle Bark (Marketing) (Amendment) Rules, 1934.

Cashew Nut Marketing (Amendment) Rules, 1934.

PUBLICATIONS.

Annual Report of the Department of Agriculture, 1933.

Agricultural Census, 1934 (period 1st March, 1933, to 28th February, 1934). Fifteenth Annual Report.

Crop Reports, July, September, November.

Bulletins.

"A Simple System of Farm Accounts and Records", by V. Liversage, B.Sc., M.S., N.D.A., Agricultural Economist. (Bulletin No. 1/1934.)

"Preliminary Observations on Coffee Roots in Kenya", by A. D. Trench, Senior Coffee Officer. (Bulletin No. 2/1934.)

"Report of Committee on Coffee Berry Disease". (Bulletin No. 3/1934.)

"The Manufacture of Egg Products", by V. Liversage, B.Sc., M.S., N.D.A., Agricultural Economist. (Bulletin No. 4/1934.)

"Report on Questionnaire on Antestia Control, 1933-34", by R. H. Le Pelley, Ph.D., F.R.E.S., Entomologist. (Bulletin No. 5/1934.)

"An Economic Study of Dairy Farming in Kenya", by V. Liversage, B.Sc., M.S., N.D.A., Agricultural Economist. (Bulletin No. 6/1934.)

"Pyrethrum Extract Spraying for the Control of Antestia on Coffee, with Suggestions for Routine Testing on Plantations", by R. H. Le Pelley, Ph.D., F.R.E.S., Entomologist. (Bulletin No. 8/1934.)

"Organic Manures, with Special Reference to Composts", by V. A. Beckley, M.C., M.A., A.I.C., Senior Agricultural Chemist. (Bulletin No. 9/1934.)

Leaflets, Press Articles, etc.

"Notes on Coffee Anthracnose ('Elgon Dieback')", by J. McDonald, D.F.C., B.Sc., F.L.S., Senior Mycologist.

"Rhodes Grass for Pasture and Hay", by D. C. Edwards, B.Sc., Agricultural Officer.

"Preparation and Application of Sodium Arsenite Poison-Bait against Antestia", by R. H. Le Pelley, Ph.D., F.R.E.S., Entomologist.

"The Dusty Brown Beetle", by F. B. Notley, B.Sc., A.I.C.T.A., Entomologist.

"Darnel, a Poisonous Weed."

"Stalkborer of Maize."

"Production of an Artificial Epidemic of Wheat Stem Rust in Kenya Colony", by C. A. Thorold, B.A., A.I.C.T.A., Mycologist. (Published in *Annals of Applied Biology* XXI, 4, November, 1934.)

A list of papers published by officers of the Veterinary Research Laboratory, is appended to the Chief Veterinary Research Officer's Report (*Vide* Vol. III).

H. B. WATERS,

Director of Agriculture.

Appendix I

STAFF LIST

AS AT 31ST DECEMBER, 1934.

A—ADMINISTRATIVE AND GENERAL.

Director.—H. B. Waters, B.A. (Oxon).

Agricultural Economist.—V. Liversage, B.Sc. (Lond.), M.S. (Wis.), N.D.A.

Accountant.—A. Walker.

Office Superintendent.—E. J. Kelly.

Clerks.—R. Abram, R. F. G. Palmer, J. Riddell, Mrs. M. A. Carr Hole, S. G. Sharp, J. B. Gould, A. E. Dawes, J. S. Nelson, S. Morrell, A. F. Wake, A. Clough, P. M. Corfe, K. G. Ball, Miss H. M. Dewar, Miss M. L. Palmer.

B.—DIVISION OF PLANT INDUSTRY.

Deputy Director (Plant Industry).—H. Wolfe, M.Sc. (Agric.).

Senior Coffee Officer.—A. D. le Poer Trench.

Agricultural Officers and Experimentalists.—A. G. Bailey, M.A., D. C. Edwards, B.Sc., A. C. Maher, M.A., Dip. Agric. (Cantab.), A.I.C.T.A.

Plant Inspectors.—T. L. McClelland, M.C., H. Naismith Jones, C. D. Knight, E. Cottington, A. J. Cooper.

SUB-DIVISION OF NATIVE AGRICULTURE.

Agricultural Officers.—W. L. Watt, Cert. H.A.S. Forestry, W. G. Leckie, B.Sc., C. O. Oates, N.D.A., N. Humphrey, W. O. Sunman, B.Sc., Dip. Agric. (Wye), E. W. Gaddum, B.Sc. (Lond.), Dip. Agric. (Wye), M. H. Grieve, B.Sc., Dip. Agric. (Edin.), T. Y. Watson, B.Sc., Dip. Agric. (Cantab.), J. E. P. Booth, B.Sc., A.I.C.T.A., R. E. T. Hobbs, U.D.A. (Reading), P. C. Chambers, B.A. (Cantab.), A.I.C.T.A. (Trinidad), R. J. Benstead, N.D.A., R. S. Ball, Dip. Agric. (Cantab.), A.I.C.T.A., J. T. Moon, Dip. Agric. (Cantab.), A.I.C.T.A., M. Halcrow, B.Sc., Agric. (Edin.), Dip. Agric. (Cantab.), A.I.C.T.A., D. H. Cairns.

Assistant Agricultural Officers.—E. L. Bradford, Dip. Agric. (Cedara), M. D. Graham.

Senior Entomologist.—T. J. Anderson, M.A., B.Sc. (Hons. Edin.), F.Z.S., F.R.E.S.

Entomologists.—H. Wilkinson, A.R.C.S., F.R.E.S., F.L.S., R. H. Le Pelley, Ph.D., D.I.C., B.Sc. (Hons.), A.R.C.S., F.R.E.S., F. B. Notley, B.Sc. (Hons.), F.R.E.S., A.I.C.T.A.

Senior Mycologist.—J. McDonald, D.F.C., B.Sc. (Hons.), F.L.S.

Mycologist.—C. A. Thorold, B.A., A.I.C.T.A.

Senior Agricultural Chemist.—V. A. Beckley, M.C., B.A. (Hons.) Cape., M.A. (Cantab.), A.I.C.

Soil Chemist.—G. H. G. Jones, M.Sc.

Agricultural Officer and Experimentalist.—S. Gillett, Dip. Agric. (Hons.) (Wye).

Clerks.—B. A. Pickering, L. O. Johnes.

Laboratory Assistants, Learner and Junior Grades.—F. McNaughtan, B.Sc. (Hons.) (Edin.), R. N. Noble, F. W. Evans, L. Burton, E. C. M. Green, G. Finch.

PLANT BREEDING SERVICES.

Senior Plant Breeder and Experimentalist.—G. J. L. Burton, M.C., B.A.

Plant Breeder.—R. J. Lathbury, M.A.

Agricultural Officer.—N. D. Spranger.

Laboratory Assistant (Junior).—G. Gamble.

GRADING AND INSPECTION (EXPORTS AND IMPORTS) GRAIN CONDITIONING AND COOL STORE SERVICES.

Chief Grader and Inspector and Manager, Cool Stores.—C. L. Silvester, N.D.A., N.D.D.

Grader and Inspector.—F. B. L. Butler, F.L.S.

Assistant Grader and Inspector.—M. Beverly.

Superintendent, Maize Conditioning Plant and Cool Stores.—D. F. Sargent.

Mechanic.—A. E. Taylor.

Clerk.—H. S. Cuthbert.

C.—DIVISION OF ANIMAL INDUSTRY.

(a) ADMINISTRATIVE AND EXECUTIVE DIVISIONS.

Deputy Director (Animal Industry) and Chief Veterinary Officer.—H. H. Brassey-Edwards, M.R.C.V.S.

Senior Veterinary Officers.—O. Dixon, M.C., M.R.C.V.S., E. J. Mulligan, M.R.C.V.S.

Veterinary Officers.—R. S. Little, M.R.C.V.S., D.V.S.M., R. L. Creery, M.R.C.V.S., W. G. Emerson, M.R.C.V.S., E. Beaumont, M.R.C.V.S., H. Hay-Barclay, M.R.C.V.S., J. Anderson, M.R.C.V.S.

Stock Inspectors.—T. Harris, L. E. Smith, D. Wyartt, P. H. Poolman, W. L. Lewis, F. J. O'Hara, G. Alcock, C. G. Norman, J. Denwett, G. W. Low.

Assistant Stock Inspector.—C. J. Hill.

(b) NATIVE SERVICES.

Veterinary Officers.—T. B. McClure, M.R.C.V.S., D. F. Macpherson, M.R.C.V.S., F. W. Aston, M.R.C.V.S., F. R. Hale, M.R.C.V.S., R. A. Hammond, M.R.C.V.S.

Stock Inspectors.—G. White, C. B. Jolley, J. H. Ward, C. D. Henderson, G. L. Murray, R. H. Cameron.

Assistant Stock Inspectors.—E. W. Temple-Boreham, J. S. Nimmo.

Instructors in Stock.—J. Anderson, A. Lambie, N.D.A., H. C. W. Guy, C. G. Bishop.

(c) SUB-DIVISION OF VETERINARY RESEARCH.

Chief Veterinary Research Officer.—R. Daubney, M.Sc., M.R.C.V.S.

Assistant Chief Veterinary Research Officer.—Vacant.

Veterinary Research Officers.—J. R. Hudson, B.Sc., M.R.C.V.S., W. B. C. Danks, B.Sc., M.R.C.V.S., W. Fotheringham, M.R.C.V.S.

Entomologist.—A. E. Lewis, M.Sc., Ph.D.

Laboratory Superintendent.—A. J. Kemp.

Laboratory Assistants.—J. T. Schultz, H. J. Gray, J. R. McQueen, E. J. Hall, W. P. Bruce, F. Lyons, S. R. Pelling, J. Forsyth.

Overseer.—G. M. Eames, Dip. Agric. (Wye).

Clerks.—J. H. Crampton, Miss R. M. Dennis, Miss A. J. Ker, Miss J. Middleton.

Clerk-Librarian.—D. Dewar.

Mechanic.—O. Stenmark.

Storekeeper.—G. W. Clochley.

Laboratory Students.—B. K. Roberts, D. N. Lewis, J. A. Edwards,
Miss B. C. Holmes.

(d) ANIMAL HUSBANDRY.

Animal Husbandry Officer.—W. D. D. Jardine, B.Sc. (Edin.), N.D.A.,
N.D.D. (Hons.).

Principal changes and new appointments in technical staff during 1934:—

DIVISION OF PLANT INDUSTRY.

Mr. J. T. Moon, Dip. Agric. (Cantab.), A.I.C.T.A., Agricultural Officer, appointed 25th January, 1934.

Mr. R. S. Ball, Dip. Agric. (Cantab.), A.I.C.T.A., Agricultural Officer, appointed 12th January, 1934.

Mr. M. Halerow, B.Sc., Agric. (Edin.), Dip. Agric. (Cantab.), A.I.C.T.A., Agricultural Officer, appointed 14th June, 1934.

Mr. M. D. Graham, Temporary Agricultural Officer, appointed as Assistant Agricultural Officer, 1st January, 1934.

Mr. L. E. Bradford, Assistant Grader and Inspector, appointed as Assistant Agricultural Officer, 13th April, 1934.

Mr. M. Beverly, appointed Assistant Grader and Inspector, 1st December, 1934.

Mr. D. H. Cairns, Temporary Agricultural Officer, appointment terminated 31st December, 1934.

DIVISION OF ANIMAL INDUSTRY.

Mr. W. M. McKay, M.R.C.V.S., was invalided from the Service on 31st October, 1934.

SUB-DIVISION OF VETERINARY RESEARCH.

Mr. J. R. Hudson, B.Sc., M.R.C.V.S., Veterinary Research Officer, was Acting Chief Veterinary Research Officer from 9th July, 1934, to 31st December, 1934.

Appendix II

GRADING AND INSPECTION SERVICES.

PLANT IMPORT INSPECTION.

The following table gives the number of packages and values of the various importations into the Colony of seeds, plants, fruit, etc., in 1932, 1933 and 1934 :—

	No. OF PACKAGES			DECLARED VALUE		
	1932	1933	1934	1932	1933	1934
				<i>Sh. cts.</i>	<i>Sh. cts.</i>	<i>Sh. cts.</i>
Seeds ..	1,274	705	1,010	54,167 29	50,855 83	57,231 36
Fruit ..	9,327	12,913	23,906	86,786 58	105,344 51	203,464 11
Plants ..	227	184	223	8,457 42	6,853 22	9,720 53
Fruit Trees..	138	165	182	17,006 15	17,651 47	22,620 86
Tea Seed ..	491	—	43	70,430 16	—	2,553 00
Bulbs ..	296	205	280	4,045 00	5,827 39	7,435 10
	11,753	14,172	25,644	240,892 60	186,532 42	303,024 96

The numbers of packages examined in 1934 shows an increase of 11,472 (80.94 per cent) over the total examined in the previous year, whilst there is a comparative increase in the declared value of Sh. 116,492.54, being 62 per cent.

Examination of the table shows that importations of fruit are mainly responsible for the large increase, showing an increase of 85.13 per cent in numbers and an increase of 93.15 per cent in value. All other classes show increases in numbers and value.

For Uganda and Tanganyika Territory, a further 117 packages of declared value of Sh. 3,989.62 and 14 packages valued at Sh. 275 respectively were passed.

GRADING AND CONDITIONING SERVICES.

Maize Grading.

The first maize from the 1933/34 season's crop arrived at the Coast on 22nd January and a steady flow of maize was received until 9th April. Old crop maize recommenced on 20th August and continued until the end of September. On 1st October new crop maize from the Moshi area of Tanganyika Territory commenced to arrive and continued until the third week in December.

(a) *Maize presented direct for grading at the Coast.*

A total of 219,629 bags of maize was presented direct for grading at the Coast. The following table shows the grades and relative percentages :—

GRADE	Number of Bags	Percentage of Total Received	Comparative Percentage for 1933
		<i>Per cent</i>	<i>Per cent</i>
K2	122,003	55.55	50.73
K2 SW	22,275	10.14	9.3
K3	47,680	21.71	19.0
K3 SW	7,607	3.46	7.02
K7	—	—	0.06
K8 F. W.	1,970	0.9	2.5
K8 F.W. SW	685	0.31	1.17
K8 N. SW	—	—	0.03
Total Graded ..	202,220	92.1	89.81
Rejected :			
Wet	10,463	4.76	8.9
Musty	20	—	0.19
Weevily	4,435	2.02	0.26
Other Causes	2,491	1.1	0.85
Total Rejected ..	17,409	7.88	10.2
Total Received ..	219,629	100.0	100.0
Re-bagged	730		
Re-sewn	84		

The total of 219,629 bags is a decrease of 52.15 per cent on the previous year's total of 458,775 bags.

Included in the total of 219,629 bags received are 13,803 bags received from the Moshi area. The following table gives particulars of this latter maize :—

(a1) GRADE	Number of Bags	Percentage of Total Received
		<i>Per cent</i>
K2	4,525	40
K3	148	1.07
K3 SW	220	1.6
K8	3	—
Total Graded	4,896	41.99
Rejected :		
Wet	8,791	63.73
Weevily	110	0.79
Total Rejected	8,907	64.53
Total Received	13,803	100.0

(b) Maize graded at the Conditioning Plant.

10,410 bags of maize were graded at the Conditioning Plant after treatment and were classified as under :—

GRADE	Number of Bags	Percentage of Total
K2	10,272	<i>Per cent</i> 98.67
K3	137	1.3
K8 FW	1	—
Total Graded ..	10,410	100.0

The total of 10,410 bags includes 8,726 bags of Moshi maize which were all graded K2. So very little Kenya maize was graded after treatment that no useful comparisons can be made with previous figures.

(c) Maize re-graded.

2,878 bags of maize were re-graded and classified as follows :—

GRADE	No. of Bags
K2	1,142
K2 SW	38
K3	196
K8 FW	5
Total Graded ..	1,381
Rejected :	
Weevily	1,496
Other Causes	1
Total Rejected ..	1,497
Total Received ..	2,878

The 1,496 bags of maize re-graded and rejected as weevily were reduced in grade from blockstacks :—

619 bags from K3 SW.

877 bags from K2 SW.

The total number of bags actually graded, totals of Tables (a), (b) and (c) is 232,917, a decrease of 56.2 per cent on the

previous year's total of 531,812 bags, and is the smallest total graded since the inception of this service in 1923.

Shipments:

Fifty-four Export Certificates in respect of 168,898 bags of maize were issued as shown in the following table :—

Number of Certificates	Number of of Bags	Description
32	118,982	(K2) Second Grade.
7	12,238	(K2 SW) Second Grade Slightly weevily
12	36,043	(K3) Third Grade.
3	1,635	(K3 SW) Third Grade Slightly weevily.

Rule 25—Local Shipments.

46,552 bags of maize were shipped to ports north of Beira, south of Port Said, and the Coast of Arabia.

The total is a decrease of 59.59 per cent on the previous year's figures of 114,971 bags.

Maize—General.

The serious loss of foodstuffs caused by the depredations of locusts in certain of the native reserves led to fairly large quantities of European grown maize being diverted to some reserves thus considerably reducing the quantity of maize surplus for export. Late planting of the crop owing to extended drought also reduced the yield. The direct result of these factors was that the quantity of maize graded was the lowest on record since the inception of the grading service in 1923.

Harvesting was carried out under very favourable weather conditions and practically all Kenya maize was dry on arrival at the Coast.

The quantity of the maize submitted for grading showed a slight improvement on the previous season's crop but the greatest care should still be exercised in the preparation of maize destined for export overseas.

Shipments of maize were made to South Africa and reports on the quality of the maize, received from the largest buyers, were very satisfactory.

CONDITIONING PLANT, KILINDINI.

Maize.

A total of 11,347 bags of wet maize was treated at the Conditioning Plant, being a decrease of 83.13 per cent on the previous year's total of 67,278 bags.

129 bags were received consigned direct to the plant and 854 bags of wet imported maize were treated.

Beans.

1,205 bags of wet beans were treated.

Experiments on treating beans of all kinds exported from Kenya for the extraction of moisture in excess of the legalised moisture content and for the destruction of bean beetle (*Bruchus*) have been carried out at intervals over the last two years. Considerable success has been obtained with all types of beans with the exception of Madagascar Butter Beans. It is considered that this type does not lend itself to the necessary processes involved.

Grading of Potatoes.

33,679 cwt. of potatoes were presented from grading and were classified as follows :—

GRADE	Number of Cwt.	Percentage of Total
		<i>Per cent</i>
K1	12,794	39
K2	19,397	58
Seed	394	1
Rejected	693	2

The total of 33,278 cwt. submitted for grading is a decrease of 23.81 per cent on the previous year's total of 43,679 cwt.

The percentage graded K1, K2, viz. 39 per cent and 58 per cent, show practically no variations from the previous season, when the percentages were 37.42 per cent and 58.71 per cent respectively. Rejections show a decline from 3.2 per cent in 1933 to 2 per cent in 1934.

Owing to amendments in the regulations governing the export of potatoes under Government Notice No. 837, The Agricultural Produce Export (Potato) (Amendment) Rules, 1934, over date of 14th December, 1934, percentage comparisons of potatoes graded K1 and K2 no longer serve a

useful purpose as many consignments of potatoes which could normally be graded K1 automatically become K2 if packed in bags when the port of destination is more than seven days' sea journey from Mombasa.

Rejections were mainly for the usual cause, cut and damaged tubers, and undersized.

The Government of Mauritius drew attention to the alleged presence of corky scrob (*Actinomyces scabies*) in potatoes exported from the Colony. Further investigation, however, revealed it to be powdery scab (*Spongospora subterranea*). Consignments for Mauritius are, at the request of shippers, disinfected with formol. The treatment can only be regarded as a temporary measure until such time as the position is made clear.

Tuber Moth was in evidence in consignments in varying incidence throughout the year.

It is alleged by exporters that cut-throat competition by Japan has seriously jeopardised the sale of Kenya Potatoes in our most fruitful markets, Bombay and Colombo.

Ships' Stores.

Export entries in respect of 3,243 bags of potatoes estimated at 5,204 cwt. were passed, a decrease of 487 cwt. on the previous year's total.

Grading of beans.

The following table gives the quantities, varieties and grade of beans submitted for grading :—

(a) Presented direct for grading.

VARIETY	K1	K2	Total Graded	Weevily	Wet	Total Rejected	Total Received
Rose Coco ..	31	—	31	—	376	376	407
Madagascar Butter Beans	1,216	112	1,328	—	—	—	1,328
Canadian Wonder	137	109	246	—	336	336	582
Mixed	—	—	—	4	8	12	12
White Haricot ..	—	—	—	—	5	5	5
	1,384	221	1,605	4	725	729	2,334
Percentage ..	59.29	9.47	68.77	0.17	31.06	31.23	100.0

(b) Graded after treatment at the Conditioning Plant.

VARIETY	K1	K2	K3	Total Graded	Total Received
Canadian Wonder ..	436	219	—	655	655
Rose Coco	162	111	—	273	273
Mixed	—	—	102	102	102
Noyeau Blanc ..	1	—	—	1	1
	599	330	102	1,031	1,031
Percentage ..	58.1	32.0	9.9	100.0	

Note.—488 bags were consigned direct to the Conditioning Plant for treatment.

The total number of bags graded, totals of (a) and (b), was 3,365, an increase of 2,926 bags on the previous year's total of 1,439 bags.

The quality of the beans was, with the exception of two consignments, very high. Damage from anthracnose has not been so much in evidence the last two years.

COOL STORES.

The following is a comparative statement of the quantities of commodities deposited in the Cool Stores since the inception of the service :—

COMMODITY	1934	1933	1932	1931	1930	1929	1928	1927	Unit
Fruit ..	276,969	126,690	103,145	181,793	193,457	155,180	128,399	102,229	lb.
Fresh Fish ..	20,941	86,021	100,441	59,541	40,607	31,857	14,196	8,583	lb.
Cured Fish ..	40,839	41,407	36,560	48,549	78,171	64,990	50,230	15,178	lb.
Cheese ..	11,422	9,595	9,752	18,325	21,200	4,037	949	3,541	lb.
Offal ..	3,991	2,749	2,760	3,130	4,449	5,528	794	472	lb.
Poultry ..	59½	64½	8½	27½	34½	48½	10½	12 11/12	Dozen.
Butter ..	3,783	1,803	5,213	5,098	9,401	2,305	2,484	1,544	Cases.
*Beef ..	49,519 lb.	35,250 lb.	292	363½	324½	301	212	211	lb.
†Mutton and Pork ..	31,273 lb.	18,692 lb.	247½	276½	325½	212	143	80	Quarters
Eggs ..	3,225	6,720	4,318	210	807	270	109	—	Carcases.
Ham and Bacon..	756	905	871	4,170	19,481	692	266	—	Dozen.
Vegetables .	2,949	4,525	634	312	140	3,702	8,161	3,979	lb.
Yeast ..	645	1,924	1,611	234	125	30	—	—	lb.
Miscellaneous ..	Vaccines	Vaccines	Plants	Serum	Milk	Milk	—	—	
	Serum	Serum	Game	Cake	—	Beer	—	—	
	Rennet	Rabbits	Milk	Chocolaté	—	—	—	—	
	Beer	Milk	Trout	Plants	—	—	—	—	
	Plants	—	—	—	—	—	—	—	
	Dates	—	—	—	—	—	—	—	

NOTE.—*Quarter of beef averages 120 lb. †Carcase of mutton averages 40 lb.

In the Annual Report for 1933 it was stated that the backward tendency noted in 1932 had been arrested. Examination of the comparative table reveals a number of very large increases in quantities of commodities deposited, notably fruit, beef, mutton and pork and butter. Fresh fish shows a very heavy decline due to financial difficulties met with by firms interested in the local fishing industry.

Other decreases are of a minor nature only.

The improved use made of the Stores is reflected in the revenue earned which shows an increase of Sh. 7,837/01 over 1933.

Both machinery units were in alternative use throughout the year and gave satisfactory service,

Visitors.

Large numbers of visitors were received and many were conducted round the mechanical units, and the Coffee Curing Works, Kilindini.

The thanks of the Department are again tendered to the Port Manager and his staff for their co-operation and assistance.

C. L. SILVESTER,
Chief Grader and Inspector.

Appendix III

KENYA RAINFALL, 1934

	Total Rainfall	Average Rainfall	No. of Years	Excess	Deficit
	<i>Inches</i>	<i>Inches</i>		<i>Inches</i>	<i>Inches</i>
Lamu	49.20	35.27	28	13.93	—
Malindi	55.81	39.91	40	15.90	—
Kwale	50.16	37.95	23	12.21	—
Teita, Voi	9.79	21.05	23	—	11.26
Kitui	24.95	40.68	30	—	15.73
Machakos	27.70	36.75	39	—	9.05
Nairobi	19.42	35.97	17	—	16.55
Kiambu	24.80	41.38	26	—	16.58
Fort Hall	38.20	45.76	33	—	7.56
Embu	37.87	41.45	26	—	3.58
Meru	46.77	53.86	21	—	7.09
Nyeri	33.69	37.28	30	—	3.59
Naivasha	17.27	28.63	30	—	11.36
Laikipia, Rumuruti..	25.71	28.00	22	—	2.29
Nakuru	21.31	36.32	25	—	15.01
Ravine	31.55	45.49	11	—	13.94
Nandi-Kapsabet ..	46.18	62.58	28	—	16.40
Uasin Gishu, Eldoret	38.93	38.74	3	0.19	—
Trans Nzoia, Kitale..	39.20	44.84	13	—	5.64
Kisumu	37.69	44.81	31	—	7.12
Kakamega	66.27	77.50	13	—	11.23
Kisii	59.69	68.08	23	—	8.39
Lumbwa	34.17	47.02	29	—	12.85
Kericho	59.25	71.02	29	—	11.77

Part II.—Plant Industry

REPORT OF THE DEPUTY DIRECTOR (PLANT INDUSTRY)

The services of the Plant Industry Division are organized as outlined in the Report for 1933. The account of the work done is this year submitted somewhat differently from the plan followed in former years because the full reports of the specialist and field officers are not appearing in this volume but in Volume II of the Annual Report. In the pages which follow therefore a brief account is given of what are regarded as the more important features of the work undertaken of the Division during the year in respect of both European and native agriculture. For ease of reference this account in the case of European and general agricultural services, is given chiefly under crop headings; if fuller details are wanted reference should be made to the appropriate sectional report in Volume II. In the case of purely native agricultural services a full account is given in the form of provincial reports from the Nyanza, Central and Coast provinces.

COFFEE.

A large proportion of the time of officers of the Department is taken up with work on coffee; not only are certain officers, such as the Senior Coffee Officer and the Plant Inspectors fully occupied with work on this crop but, as will be seen from their reports, the Entomologist, Mycologist, Senior Agricultural and Soil Chemists and two Agricultural Officers find that coffee work employs them for a considerable portion, in some cases for the major part, of their time. Nevertheless a defect in the Department's coffee services is inadequate "full-time" staff.

The Bio-chemist appointed by the Coffee Board primarily to investigate the effect on the coffee bean of the various stages of its preparation after picking—especially the fermentation process, arrived early in the year and was accommodated at the Scott Laboratories where he has been working in close association with the officers of the Department engaged on coffee research.

COFFEE VARIETIES, TREE SELECTIONS, VEGETATIVE
PROPAGATION AND BREEDING.

Not the least important work which is carried on with coffee is that which has as its aim the production of types of coffee giving high yields of good quality coffee which are suitable to the various districts in the Colony with their different problems of climate and disease.

The major part of the work up to the present time has been conducted at the Scott Agricultural Laboratories, but experiments with variety trials and vegetative propagation of coffee are being or will be conducted at Sotik, Kitale, and Mount Elgon. The variety "Harar", imported from Abyssinia has shown particular merit at the Scott Agricultural Laboratories during the past year, while "Jamaica Blue Mountain" is finding favour in the higher rainfall areas.

Twelve new varieties were added during the year to the collection of varieties and types at the Scott Agricultural Laboratories. These were obtained from Java, through the good offices of Dr. Cramer, from Amani, Jamaica, the Congo Belge and India. A selection of the fifth generation made at the Scott Laboratories from Kent's selected was also planted out.

Tree Selections.

A number of outstanding trees were recorded and observed at the Scott Agricultural Laboratories and on neighbouring plantations during the year. Observations on previous selections were continued and monoclones were taken for reproduction of the more promising trees. These trees are also being reproduced from seed when further selections from the progeny will be carried out. Tree selections were made also in the Trans Nzoia with particular reference to securing resistance to Coffee Berry Disease and "Elgon Die-back". These trees, also, will be utilized for vegetative propagation and for breeding.

Vegetative propagation.

Considerable progress was made during the year and it may be said that grafting of coffee presents little difficulty at Nairobi and Sotik. This work is only just being commenced in the Trans Nzoia. A number of different grafts have been planted out at the Scott Agricultural Laboratories and Sotik.

The vegetative reproduction of coffee by means of rooted suckers has been successful at all centres but a successful technique for the propagation of coffee by cuttings has not yet been achieved.

Breeding.

The Senior Coffee Officer, reporting work at the Scott Agricultural Laboratories, states that :—

(a) Thirty plants, consisting of five arabica selections made by the Geneticist, East African Agricultural Research Station, Amani, were received from Amani during the year and planted out for observations.

(b) Selfing of selected trees has been continued. The series "A" (Kenya Selected) is now ready for selection and selfing in the second generation.

(c) With the object of obtaining possible hybrids of merit, a number of crosses were made during the year.

GREEN MANURES AND COVER CROPS.

Investigations which have the aim of obtaining suitable cover crops and green manure crops for coffee have been continued at the Scott Agricultural Laboratories for many years and for several years at Kitale.

At the Scott Agricultural Laboratories *Medicago sativa* (Cossack Lucerne), *Glycine javanica* and *Coronilla varia* are preferred at present. Other cover crops of some value are *Mucuna utilis*, *Calopogonium orthocarpum*, *Calopogonium mucunoides* and *Phaseolus lunatus*. The most suitable green manure crops are considered to be *Dolichos lablab* (Njahi), *Lathyrus sativus* (New Zealand Grass Pea), *Pisum sativum* (Field Pea), and *Phaseolus lunatus* var. (Mixed Lima Beans).

As will be seen from the report of the Agricultural Officer, Kitale, some twenty-three green manures and cover crops were tried on the Government Experimental Plot at Kitale. Many of them gave most promising results but it is too early as yet to say which of a large proportion of successful ones are the best. These trials are being continued and it is anticipated that after a few years continuous trials it will be possible to narrow down the choice of crops which can be considered suitable for use in coffee plantations in the Trans Nzoia and similar districts.

SHADE TREES.

The provision of suitable shade trees for the various coffee districts is a problem of great importance and deserves the amount of attention which it is receiving from the Department. Trials of some twenty-five trees are being made in particular at the Scott Laboratories and Kitale. The names are given in the reports of those two stations.

ARTIFICIAL SHADE.

The density of a canopy of artificial shade at the Scott Agricultural Laboratories was reduced with apparent beneficial results. It seems possible, from the following statement by the Senior Coffee Officer, that shading may prove to be an important factor controlling quality of the bean :—

“Samples from shaded and unshaded trees were subjected to a liquoring test in Nairobi and the following results were obtained :—

Shade coffee	...	20½ points.
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Unshaded coffee	...	14½ points.
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The liquorer reported that whilst both samples were very lacking in acidity, the appearance both in the raw and the roast of the shaded coffee was far better than the unshaded.”

A small piece of artificial shade, covering about fifty trees, was erected for observational purposes at the Experiment Plot, Kitale.

PRUNING.

The multiple-stem system of pruning is continuing to find favour for its simplicity and economy in labour, while over the last six years the average yields of two plots of coffee at the Scott Laboratories pruned on the multiple stem and single-stem systems have been almost equal, that is 6.6 cwt. and 6.26 cwt. respectively.

There is much yet to be learned about the technique of carrying out the multiple-stem system and investigations are still being made into it. It is likely that differences in climate between districts will necessitate further local difference in technique. The monthly pruning investigations were continued at the Scott Agricultural Laboratories during the year and the following conclusions were drawn for this, the first year only :—

1. That no flowering can be expected on new wood until it is at least ten months old, when trees are grown under conditions similar to those at this station.

2. The time of pruning may thus materially influence the time of flowering. Nevertheless it must of necessity be several years before any definite opinion can be expressed on the influence of flowering in relation to pruning at various periods; climatic conditions will undoubtedly be important factors.

3. Whilst it was observed that heavy pruning carried out on trees with a dense foliage caused severe sun scorching on the remaining leaves during a period of intense sun, the condition did not appear to cause any noticeably bad effect during the season, when the trees made their growth.

SPRAYING.

Further spraying tests were carried out during the year at the Scott Agricultural Laboratories, with varying strengths and numbers of applications of Carbide and Bordeaux mixture and with Burgundy mixture. The following conclusions were arrived at :—

1. Although sprayed trees appeared, like the unsprayed, to wilt very severely during the dry weather, recovery after a light rain was most rapid, and no die-back of the primaries occurred.

2. The sprayed plots at the end of the season were in a good condition, and spiking for the coming season's crop was evident. In contrast, there is little possibility of a crop being obtained from the unsprayed plot.

With regard to the time of spraying it appears that applications in the months of March and June are preferable to spraying in March only and that in order to prevent leaf fall during July and August one of the sprayings must be applied during March or April. Spraying carried out earlier than March and any subsequent spraying done does not appear to have the desired effect of preventing leaf fall later on in the year. Burgundy mixture seems as successful as Carbide and Bordeaux but as the year was an abnormal one further tests between the two sprays will have to be made.

MULCHING.

The use of grass mulches on coffee plantations is rapidly becoming more common. At the Scott Agricultural Laboratories, owing to the severe drought in 1933, and the poor rains in April, the mulched plots did not seem to benefit relatively to the soil-mulched (control) plots. The coffee from the mulched plots, when subjected to a liquoring test, nevertheless

was slightly better than that from the unmulched plots, especially as regards acidity.

The two-year-old trees on the plots at Kitale showed decided benefit from a heavy grass mulch, and were very verdant right at the end of the dry season.

DISEASES OF COFFEE.

COFFEE BERRY DISEASE.

It has been brought home more and more during the year to all officers concerned with the work on coffee berry disease that there is little hope of success in palliative measures. The most hopeful line of attack appears to be the substitution of plantations of a resistant type of coffee for those of the susceptible type already established. The Blue Mountain variety still appears to be resistant to the disease and the use of freshly imported tree seed is recommended; selections of promising material are also being made amongst other varieties at Sotik and in the Trans Nzoia. Substitution from seed is an expensive process even if seedlings are interplanted in old coffee and a quicker method of substitution is to graft selected resistant scions on to the existing susceptible root stocks in the plantations of the French Mission type. Experiments with a suitable technique for this process are now in progress but it remains to be seen whether the resistant strains will retain their resistance when grafted on to susceptible stock.

"ELGON DIE-BACK."

This disease, which strongly resembles in many respects the "Anthracnose" of coffee reported in Mysore and the Malay States, and which, earlier on, was given the somewhat unfortunate name of "Elgon Die-Back", has been observed during the year on plantations as far afield from the original sites of the disease as South-East and North-East Cherangani. The latter plantations are, of course, on sandy soils derived from rocks of the basement complex, which are entirely different in physical and chemical composition from those derived from the volcanic tuffs, agglomerates and lavas of Mount Elgon.

The Senior Mycologist visited Mount Elgon in June and made numerous artificial cultures from diseased tissues. He reports :—

"The disease affects branches and suckers and nearly always begins at a point distant from the tip, generally

at a node. It spreads up and down the affected shoot until all the tissues for a considerable distance from the tip backwards are dead, at which stage the trouble is indistinguishable from common die-back. Among the fungi isolated from various kinds of diseased tissues, several species or strains of *Phoma* preponderated.

Colletotrichum, so common on dead coffee tissues in other parts of the country, occurred occasionally only."

Mr. Thorold, Mycologist, was stationed on Mount Elgon towards the end of the year in order to continue intensive investigations into the disease.

PESTS OF COFFEE.

ANTESTIA.

Investigations into *Antestia*, commenced in 1933, were continued in 1934. In addition, a considerable amount of work was done in examining the utility of available control measures. Dr. Le Pelley states: "It was shown conclusively that hand-picking is not a method of value for the control of *Antestia*, and considerable sums are annually wasted on this measure." As regards control by means of spraying with pyrethrum-extract, work was chiefly directed to improving the methods of field application. *Antestia* was still a very serious pest during the year, but during the last three months of the year a general fall in their numbers was noted.

MEALY BUG.

Mr. Notley reports: "Mealy bug caused, if anything, rather less damage than in previous years, but this may be due to the fact that it did not spread into any new coffee areas, and to the increasing practice of banding in areas where mealy bug is present, rather than to a lessened severity in the attack of this pest. A number of cases were recorded where mealy bug which had broken out early in the year refused to clear up despite banding; the reasons for this are not clear."

An attempt was made during the year to introduce parasites of the Mealy Bug (*Pseudococcus lilacinus*), through the courtesy of Dr. Thompson of the Parasite-Breeding Station at Farnham Royal, England, and Professor Smith of California. These introductions consisted of a consignment of *Coccophagus gurneyi*, *Leptomastidea abnormia* and a *Hyperaspis* sp., the first two parasites and the third a predator of

Pseudococcus gahani, the Citrophilus mealy bug. Mr. Notley adds: "Only the first arrived alive, and about thirty adults were obtained. Mating and oviposition in *P. lilacinus* took place, but no adults of the parasites emerged from the parasitised mealy bugs. This was not unexpected, since though *C. gurneyi* has proved a most effective parasite of the Citrophilus mealy bug in California, most of these internal parasites of mealy bug are very specific in their habits, and whilst they may not distinguish between species of mealy bug for purposes of oviposition, the eggs which are laid in the wrong species usually find conditions totally unsuitable for development. In other words, a mealy bug is strongly resistant to parasites which are not its normal parasites.

"These introductions of parasites of mealy bugs other than *Pseudococcus* may therefore be regarded purely as shots in the dark, and rather unlikely to succeed. Further introductions, however, are to be made.

Continued efforts are being made to get into touch with countries whence more specific parasites of the Kenya mealy bug are likely to be obtained."

During the year the Central Province was made a closed area with a view to the prevention of the spread of mealy bug to coffee-growing areas west of this area. No plants of and sort, or parts of plants except seeds, may now be taken out of the Central Province to the west except under permit from the Department, after examination. Certain accredited nurseries, however, are examined once a fortnight, and these nurseries may send plants out of the Central Province after treatment and examination.

GENERAL.

Observations on *Lygus*, Leaf-Miner Moth, and other coffee-feeding insects were made during the course of the year. The former insects gave practically no trouble in the season under review. White Borer, *Anthores leuconotus*, was a notable pest in the Makuyu-Ithanga district. Yellow-headed borer was recorded from various localities, but caused little damage.

CARBOHYDRATE DIE-BACK OF COFFEE.

During the year it was discovered that the usual type of die-back which occurs in the Kisumu-Londiani district was not due to a lack of nitrogen, but to carbohydrate deficiency. It is of no use applying nitrogen when yellowing of the foliage

appears as it is then too late; the nitrogen must be applied early in order to increase the amount of leafage and hence to augment the supply of carbohydrates. Drought conditions, states the Senior Agricultural Chemist, caused yellowing and die-back at the Scott Agricultural Laboratories. This was due to a deficiency in carbohydrate, a condition which had never been observed before.

Observations in relation to this form of die-back were made on sand cultures of coffee by the Soil Chemist who found as follows: "With the exception of the nitrogen-starved tree, the series of coffee trees growing in sand culture with various nutrients produced very heavy crops in relation to the amount of leaf on the trees. They have suffered severely from leaf fall and die-back due to carbohydrate deficiency. Examination shows that although the dried berries contain a certain amount of small beans all portions of the trees including the root system have suffered very severely from attempting to over-bear, leaving much dead wood and root tissues. The damage to the trees bears a closer relation to the attempted over-bearing than to any differences in nutrition. The previously least vigorous nitrogen-starved tree bore only a small crop with the result that it now carries the most leaf and the least dead tissues. It is to be noted that over-bearing due to carbohydrate deficiency, that is attempting to mature a crop that is out of proportion to the effective amount of leaf, can bring about a very drastic set-back to the coffee tree, confirming the conclusions based upon many field observations reported elsewhere."

COFFEE SOIL INVESTIGATIONAL WORK.

Laboratory work on the phosphate status of the Kikuyu red loam with special reference to the availability of organic phosphate has been continued. A delicate equilibrium has been found to exist between the so-called "available" and "unavailable" phosphoric oxide content of the soil. There is a rapid replacement from reserves as the more available portion is removed by plant growth, and again added soluble phosphatic fertilizers show an equally rapid change over from "available" to "unavailable". The addition of both organic matter and phosphate has now been recognized as a feature of good coffee husbandry. Field evidence indicates that added phosphate shows a greater response when added to red soils that are not low in organic matter. It is believed that this is brought about due to a greater proportion of the added phosphate being held in conjunction with soil humus and thus

protected whereas less gets temporarily tied up to the reactive mineral colloids of the soil. Laboratory experiments on minature composts pits are now being carried out to find out to what extent added phosphate may be more beneficially applied to the soil via the compost pit. It is appreciated that the treatment will perhaps lessen the solubility of the phosphate as determined by arbitrary laboratory methods, but it is believed that on the whole the protection from reversion would be beneficial in the special case of the red coffee soils.

MAIZE.

The staff of the Plant Breeding Services and the Agricultural Officers, Njoro and Kitale, spend a considerable portion of their time on investigations designed to improve the yield of maize; that is both by breeding better varieties and by improved cultural methods. The field staff at the Scott Laboratories undertakes the improvement, by selection of Muratha maize for issue to native reserves in need of an early maturing variety of flat white maize.

MAIZE BREEDING.

The work of maize breeding was continued at Njoro and Kitale. Many hundreds of plants were selected and selfed from the selfed lines of the previous year. Nearly 300 selfed cobs of the fourth and fifth filial generations were retained for further breeding at Kitale and some 130 of the fourth filial generation for similar work at Njoro. Preliminary crosses will be made in 1935 between certain of these lines at both centres in order to see whether the desired results are likely to be obtained from this work. Some 10,000 plants should be crossed or selfed during the year, but this will depend upon additional funds and storage accommodation which are urgently needed at Kitale if this important work is to proceed satisfactorily.

Considerable difficulty is experienced in breeding strains resistant to *Fusarium* diseases since these do not appear to any extent until after the plants have flowered and selfing has been completed. The selfing of a large number of plants in the most promising lines is having fairly satisfactory results in that a small proportion of them prove to have a measure of resistance to these diseases. This particular kind of breeding work was started in 1930 and it is hoped that it will lead to the production of high yielding strains of maize resistant to the ear, root and stem rots carried by the *Fusarium* spp.

A large measure of success has been secured up to this point as regards resistance to White Blight (*Helminthosporium turcicum*), and Red Rust (*Puccinia sorghii*). At present these diseases, in the aggregate, seriously lower the yields of maize in the Colony.

MURATHA MAIZE.

Selection work for improvement in this variety of maize still continues, particular attention being paid to earliness and resistance to White Blight (*Helminthosporium turcicum*) and Fusarium diseases. Considerable strides have been made in recent years in the improvement of this maize which, though a short season crop (only five months), is well able to yield 10-12 bags per acre and is well suited for export as a flat white maize. The breeding work is focussed at the Scott Agricultural Laboratories; improved seed is annually issued from there to seed farms in native reserves. It is from the seed farms that seed is issued in an organized manner to natives, location by location replacing the old seed. Mass selection is practised on the seed farms. At present the seed which reaches the farms is scarcely first quality, as the breeding plot at the Scott Agricultural Laboratories is small, but this disability is being gradually overcome as the proportion of good seed in the crop at the Laboratories increases.

MAIZE SEED COMPETITIONS.

In conjunction with the Royal Agricultural and Horticultural Society of Kenya, the Department again carried out maize seed competitions. This statistical test of the quality of seed was made at three centres, Kitale, Rongai and Njoro, for the first time this year—Rongai being a new centre for the test. Twenty-six entries were received for each competition. The results of these competitions again demonstrated the increased profits which may be made in maize growing by the use of good seed and at no greater cost to the producer. The difference in yield between the seed of the top and bottom competitions in the ranking lists at Kitale, Rongai and Njoro were, in spite of being partially marked by the poor season, 3.58, 2.88 and 4.33 bags respectively per acre. It was noticeable this year too that acclimatisation played a larger part in determining the position of the various entrants in the yield table. Generally speaking, entrants from the district did best in the local competition. It is probable that selection is of a higher standard all round, this allowing acclimatisation to have its full effect. Even if entrants do not sell seed, they do, if they enter for the competition, obtain

a very good idea of the yielding ability of their own seed and whether their selections are being made along the right lines.

With reasonable market prices the increases in yield prices obtained by good selection are clearly sufficient to make all the difference to profits. At Njoro the lowest yield was 7.12 and the highest 11.45 bags per acre; at Rongai the corresponding yields were 6.23 and 3.35 bags respectively and at Kitale 13.88 and 10.30 bags respectively. There is clearly great room for improvement by means of mass selection and the policy is to get the farmer to do this through the incentive of the seed competitions whilst the Department concentrates on the more technical and superior method of in-breeding followed by out-breeding. Considerable time is given by officers of the Department every year in instructing farmers in the selection of disease-resistant and disease-free seed.

MAINTENANCE OF FERTILITY OF MAIZE LANDS.

Experiments were continued in the chief maize growing areas with the object of testing the efficacy of green manuring as a means of economically maintaining soil fertility at a level sufficiently high to produce profitable yields of maize. Further experiments were continued which have as their aim the ascertaining of the best methods of crop husbandry to employ for the green-manuring of cereal lands. These included further investigations into the possibility of interplanting maize with green manure crops, with the object of saving a season.

Good results were obtained from the rotational green manuring experiments held on three different soils in the Trans Nzoia area. The plots which were green manured the previous year gave significant increases of 3.45, 5.78 and 5.38 bags respectively over the un-green-manured controls. The following table shows the results clearly :—

YIELD OF MAIZE IN 1934

EXPERIMENT	CONTROL PLOT	PLOTS GREEN MANURED, 1933		
	Bags per Acre	Bags per Acre	Increase in Bags	Increase Per Cent
A	8.90	12.37	3.47	39
B	16.28	22.06	5.78	35.5
C	14.12	19.50	5.38	38.1

Average increases in yields of some two bags per acre are usually obtained in these experiments two years after green manuring; coupling this with the four or five bag increases the first year, the indication is that green-manuring one-third of the land every year results in an improvement of yields by some three bags per acre over the three years.

Similar experiments at Rongai again gave no results and experiments over a number of years show that it is doubtful whether green manuring is ever likely to be a successful practice in this somewhat drier area. There is every reason to believe that composting presents a more hopeful method of soil improvement in this and similar areas and experiments involving the use of compost instead of green manures are to be begun in 1935.

WHEAT.

Wheat was again a successful crop this year, averaging 4.2 bags per acre. The new physiologic form of stem rust No. K4 appeared to be prevalent over the country, but little damage was done by it. Some 50 per cent of the wheat grown consisted of departmental productions which possess a fair measure of rust resistance, and are particularly suited to areas of 7,000 to 9,000 feet in elevation, where wheat is now mostly grown. The lower and very warm elevations, where wheat is not so much grown now, require a more reliably rust-resistant wheat than Kenya Governor and as early maturing. If present yields per acre are maintained, any increase in acreage under wheat will result in a export trade with consequent reduction in the pool price and wheat will therefore tend to be grown in areas for which rust-resistant varieties are already available and where high yields can be obtained.

The employment by farmers of appropriate measures for controlling "Take-all" resulted in a considerable decrease in the severity of this disease. It is probable, however, that where it becomes troublesome a rotation in which there is at least a two years' rest from wheat will become necessary. As stated in a previous report, the use of temporary pasture leys should serve a useful purpose in this respect and investigations are in hand for suitable leys. The darnel plant was found to be widespread in some localities with a resultant admixture of darnel seed in the wheat, thus giving a distasteful flavour to flour. The mills refused to accept wheat containing more than $\frac{1}{2}$ per cent of darnel and measures were devised by the Department to enable growers to eradicate the weed from their fields.

WHEAT BREEDING.

The investigational work on wheat, under the Plant Breeding Services, is almost entirely connected with the breeding of rust resistant varieties and is conducted at the Plant Breeding Station, Njoro, 7,100 ft. altitude; Marindas Farm, Molo, 9,000 ft.; and the Scott Agricultural Laboratories, 5,700 ft. The work is centred at Njoro where wheats are bred for resistance to stem rust (*Puccinia graminis*) and yellow rust (*Puccinia glumarum*); any promising new strains are given their final tests for resistance to yellow rust at Molo where climatic conditions are far more favourable to this rust than at lower altitudes. The special work at the Scott Laboratories is the breeding of very early wheats resistant to stem rust only; yellow rust is not taken into account as it scarcely occurs at all under the warm conditions obtaining there.

The new variety of wheat No. N.B. 230 has proved an increasingly useful stand-by at the higher elevations where resistance to yellow rust and to form K.2 of stem rust are primary considerations. This wheat is steadily replacing Equator which is very susceptible to most forms of stem rust including K2 (the usual high altitude form), though highly resistant to yellow rust. Invasion of the higher altitudes by other forms of stem rust than K2 in epidemic form might result in considerable damage to N.B. 230 but this risk, not as great a one as might be supposed, is being taken by farmers. Kenya Governor still stands up to all but the most severe epidemics of stem rust and is a popular wheat at the medium altitudes of 6,500 ft. to 7,500 ft. where yellow rust, to which it is only very slightly resistant, is far less dangerous than at higher altitudes. Sabanero, imported from Peru, is proving rust resistant at the medium altitudes but is of very poor baking quality. Burbank, resistant to two out of the four forms of stem rust, and B256 C.3 (L) (a departmental production) are proving useful wheats in the Plateau-Burnt Forest area.

NEW WHEATS.

The wheat breeding work again shows promising progress. Some of the newer wheats are now in course of multiplication, prior to issue to farmers, whilst in the case of one cross (No. 112) twenty bags, comprising several different strains, were issued. This wheat did extremely well during the year, several farmers obtaining yields of ten to thirteen bags per

acre off plots of four to five acres. This wheat possesses high yielding ability and good strength of straw. It is a medium to slow maturer and is particularly suited to the higher altitudes since it is resistant to yellow rust, highly resistant to three forms of stem rust and moderately resistant at the higher altitudes, though not at the lower, to form K2. It is likely to take the place of wheat B.230 in due course, Further very promising strains of wheat are from crosses Nos. 130, 131, 117, 122 and 58. Strains out of the two former crosses possess resistance to all four forms of stem rust and to yellow rust as well, so that they are likely to be well suited to the higher altitudes and should displace Equator, No. B.230 and Cross 112. Some strains from crosses Nos. 117 and 122 possess the same stem rust resistance as Cross 112 but they are no more resistant to yellow rust than Kenya Governor. They should not therefore be grown at altitudes exceeding 7,500 ft. They should be well suited to the medium altitudes, though there is danger from form K2 of stem rust in any season in which it may be epidemic. Their excellent baking quality, inherited from Marquis wheat (the cross was Marquis x an Njoro hybrid), should make them popular wheats to grow in areas like the Burnt Forest. An extremely promising wheat for the medium and lower altitudes, as promising as 130 and 131 are for the higher altitudes, is cross No. 58. Some strains from this cross are resistant to all four physiologic forms of stem rust and are sufficiently resistant to yellow rust to be grown up to 7,000 ft. or a little more. This wheat appears to be just early-maturing enough even for the very short season districts.

In addition to the above wheats, which are the products of the Njoro station, another group of wheats bred at the Scott Laboratories deserves mention. These wheats are bred from Kenya Standard crossed with Kabete hybrids. They are all highly resistant to three forms of stem rust but are susceptible to form K4. The reason for susceptibility to this form is that Kenya Standard was susceptible to it. The discovery of the existence of this form was not made until after Kenya Standard had been bred and used as a parent. The probabilities are that this form of stem rust is new to the Colony; it certainly did not manifest itself during the years in which Kenya Standard was bred. The usefulness of these new Kabete wheats depends entirely on the frequency with which form K4 is epidemic. It has only once appeared slightly on Kenya Standard—the year it was discovered. It

is prevalent again this year but the new Kabete wheats have not suffered though they are being grown for trial and multiplication by a number of farmers in different parts of the country. These wheats are very early maturing and good yielders and the indications are that some of them are of good baking quality. As soon as form K4 of stem rust was discovered a further series of crosses was made with a view to eliminating susceptibility to it; the hybrids were in the second filial generation this year and large numbers of plants resistant to this and the other forms of stem rust have already been picked out.

It is of interest to note that all the above mentioned wheats have been sent to the Dominion Rust Research Laboratory, Winnipeg, for a test of rust resistance under Canadian conditions. Wheats known to be susceptible in Canada were included in the test. The rust attack on the susceptible wheats ranged from a 65 per cent infection upwards, on the Kabete wheats 10 per cent, and on crosses 112, 122, 131 and 58 no infection at all. These results, following on resistance to rust shown by Kenya wheats in Australia, are very satisfactory.

MILLING AND BAKING QUALITY OF NEW WHEATS.

Of great assistance in the wheat-breeding work are the analyses of baking quality made in England, through the good offices of Messrs. Unga, Ltd. These are made on physico-chemical basis and can be done with two or three pounds of wheat. The test is not a complete one but gives a very useful indication of baking quality and enables selections of strains of wheat to be made on that basis. Crosses 117 and 122 possess the best milling quality whilst Cross 112 is generally rather inferior and belongs to the "filler" class of wheat. Crosses 130 and 58 possess useful types and the Kabete wheats are very satisfactory.

PASTURE RESEARCH.

Early in the year the experimental work of the officer in charge grassland improvement was moved from the Scott Agricultural Laboratories to the Veterinary Research Laboratory. Facilities for the work at the former place were limited owing to the lack of space and of animals for grazing experiments. Up to the present pasture research in Kenya, other than the making of general preliminary observations of an ecological nature, has mainly been concerned with the arable

farming areas. The maize and wheat growing areas include the higher rainfall districts and are those in which yield of butterfat per acre may be expected to be highest.

In addition to the various variety trials and experiments conducted by the Agricultural Officer in charge of grassland improvement and to the numerous manurial experiments and larger sized plots for grazing trials, the Agricultural Officers for the Nakuru and Trans Nzoia districts had well over 300 variety trial plots of grasses and pasture legumes as well as large scale grazing trials. Considerable attention in fact is being given by them to the use and improvement of pastures and the work in progress comprises examination of the possibility of improving natural veldt by pasture management and investigation of the best methods of establishment of temporary leys and permanent pastures of indigenous or imported grasses and legumes, thereby not only restoring the fertility of the cereal lands but making use of them for the production of butterfat.

In many instances the ordinary grazing consists of degenerated pasture in which coarse unpalatable grasses predominate owing to a progressive decline in fertility of the soil, over-grazing or grass-burning; in other districts Kikuyu Grass (*Pennisetum clandestinum*)—especially on recently cleared forest land—or Star Grasses (*Cynodon* spp.) form a very large percentage of the herbage and it only remains to preserve this desirable grazing by appropriate management. Where the veldt is poor it is possible that it will be quicker and more beneficial to plough up the land and to replant with proved superior indigenous or imported pasture plants rather than to hope for gradual betterment by intensive grazing. The possibility of restoring the fertility of worn-out cereal lands by natural regeneration of grasses on a fallow left for six or seven years, is to be included in the programme of future investigational work.

While it has been said that in many cases it will be better to plough up inferior grassland and to replant superior grasses, it is interesting to note the results obtained in an experiment conducted by the Agricultural Officer in charge of grassland improvement. A number of indigenous grasses were cut at three times in the year; in January and April, following periods of maximum growth, and in March, following a period of minimum growth. The analyses were as follows :—

TABLE 1.—DRY MATTER BASIS

GRASSES	Month	Crude Protein	Total Ash	Silica Free Ash
<i>Pennisetum clandestinum</i> .	January ..	19.72	9.81	6.32
	March ..	16.38	8.30	6.33
	April ..	20.51	10.51	8.61
<i>Cenchrus ciliaris</i>	January ..	16.27	11.66	7.05
	March ..	16.60	13.28	6.56
	April ..	19.86	14.19	9.11
<i>Panicum coloratum</i> ..	January ..	15.87	9.72	6.92
	March ..	23.90	10.40	8.85
	April ..	20.32	9.95	7.64
<i>Amphilophis pertusa</i> ..	January ..	12.55	11.42	5.39
	March ..	14.45	12.64	6.36
	April ..	17.60	12.84	9.00
<i>Paspalum dilatatum</i> ..	January ..	16.58	9.58	5.87
	March ..	16.06	10.73	6.31
	April ..	17.57	10.56	6.74
<i>Chloris gayana</i>	January ..	10.47	8.68	5.77
	March ..	15.32	10.18	5.90
	April ..	15.35	18.17	14.07
<i>Digitaria eriantha</i> ..	January ..	16.82	11.08	6.30
	March ..	15.12	11.62	5.94
	April ..	17.69	11.27	6.52

It is observed in the report from which the table is taken that: "These figures are remarkably good for East African grasses and are comparable as regards crude protein and silica free-ash with British grasses under a similar system of cutting, although the composition of the ash is probably different."

It is of interest to compare figures obtained for some of the above grasses in March 1931, under a system of infrequent cutting:—

TABLE 2.—DRY MATTER BASIS

GRASSES	Crude Protein	Total Ash	Silica Free Ash
<i>Pennisetum clandestinum</i>	10.3	9.7	6.2
<i>Cenchrus ciliaris</i>	12.5	13.1	10.6
<i>Panicum coloratum</i>	11.8	10.7	8.0
<i>Amphilophis pertusa</i>	9.1	13.4	4.3
<i>Paspalum dilatatum</i> (Leaf only) ..	13.0	11.5	5.7
<i>Chloris gayana</i>	7.9	10.7	5.6

The Department of Agriculture is indebted to Professor R. G. Linton of the Royal (Dick) Veterinary College, Edinburgh, for his courtesy in providing for all the analyses of grasses which have been given above.

There is little doubt that Kikuyu grass (*Pennisetum clandestinum*) is the most valuable grass for the higher altitudes in the settled areas where the rainfall is high and the temperatures cool. Together with Kenya Wild White Clover (*Trifolium johnstonii*) this grass makes excellent pasturage. Experiments are in progress to determine the most suitable pasture management to maintain the high soil fertility requisite for Kikuyu grass, and to check the ingress of the coarser "succession grasses", where the natural conditions are such as to permit the establishment of this highly nutritious and palatable grass.

At the highest altitudes such as Molo (9,000 ft.) the English grasses Cocksfoot (*Dactylis glomerata*), Perennial rye grass (*Lolium perenne*), Italian rye grass (*Lolium italicum*) and Meadow Fescue (*Festuca elatior*) show great promise, some plots of these grasses being in their third season. No great success has as yet been attained with imported clovers, however, though Birdsfoot trefoil (*Lotus corniculatus*) gave an excellent stand from volunteer seeding in the third year, effectively smothering all weed growth.

Indigenous Rhodes grass (*Chloris gayana*), collected at Kitale, may be of considerable value at Kitale (6,200 ft.), Njoro (7,100 ft.) and Rongai (6,000 ft.). This grass showed itself to be very drought resistant and while it may be grazed it has especial use as a hay grass. This strain was superior at Rongai to the imported Australian Rhodes grass, being more leafy. It is reported on the other hand, that the Australian strain gave nearly three times the bulk of the indigenous grass at Njoro, and was very successful at the Scott Agricultural Laboratories, Nairobi, and at the Ngong Animal Husbandry Centre.

Molasses grass (*Melinis minutiflora*) is another African grass which should find increasing favour as a pasture grass and was very successful at Kitale, Njoro and Rongai; not only in Molasses grass very drought resistant, but it responds rapidly to the first showers of rain after the dry season and is apparently very palatable.

Naivasha Star grass (*Cynodon plectostachyum*) grows luxuriantly at Rongai and Kitale and may be considered one of the best grazing grasses for these areas.

Many grasses were imported from various parts of the world and planted in 1933 and 1934; of these *Palatatum dilatatum* from Australia is one of the most valuable. This grass is drought resistant and made luxuriant growth at Kitale, Rongai and Njoro. *Paspalum scrobiculatum* which is indigenous to the area was reported on very favourably from Kitale, being very palatable though at certain seasons it is attacked by leaf spots.

Phalaris tuberosa, another drought resistant Australian grass (originally of Mediterranean origin) made strong growth at Molo, Njoro and Kitale, though it did not appear to relish the hot dry conditions of Rongai. It is certain that this grass merits further investigation.

There are, it will be seen, a great many grasses which may be expected to solve the problem of providing good pasturage in the three areas mentioned. The question of obtaining legumes suitable for grazing, where these do not occur naturally, is more difficult. Korean Lespedeza (*Lespedeza stipulacea*) and Kobe Lespedeza (*Lespedeza striata*), annuals are very useful for this purpose at Kitale and re-seed themselves freely. They produced little bulk at Njoro and were not a success at Rongai.

Burr Clover (*Medicago denticulata*) from New South Wales makes excellent growth at Kitale, Rongai and Njoro and may have a good future as a pasture legume in Kenya. *Medicago lupulina* also looked worthy of further trial at Kitale and Molo.

Experiments are being carried out at Rongai and Njoro, where the rainfall is only 30 to 35 inches to ascertain whether low-crowned varieties of lucerne such as the New Zealand "Tagerim" may not serve as pasture legumes.

THE EFFECT OF GRAZING ON NATURAL PASTURE.

The officer in charge of grassland improvement is carrying out experiments to test the effects of grazing in some of the drier areas as well as in the high moisture-low temperature areas. At Ngong and Machakos the effect of grass burning is included in the experiments.

During the course of experiments he has observed that (a) the removal of the accumulation of old growth is essential in a herbage dominated by *Themeda triandra* if this grass is to remain dominant; (b) either grazing or burning appear to have much the same effect, at least over the comparatively

short period of these trials; (c) heavy grazing with cattle does not appear to have had any detrimental effect, in fact the ground cover seems to be rather better on some of the heavily grazed plots. Very rapid growth takes place in this type of herbage—in which *Themeda triandra* is dominant—over two more or less short periods in the year. Such pasture can only be regarded as of value for ranching owing to the fact that the herbage is mature and dry for a considerable part of the year. Other grasses such as *Cynodon* spp. may prolong the period of good grazing but chief reliance must be placed on the conservation of fodder.

THE COMPARATIVELY LOW MOISTURE AREAS.

There are large areas in Kenya of land with an ill-distributed rainfall of 20 to 25 inches, in which the characteristic vegetation is thorns (*Acacia* spp.) and a poor cover of grasses such as *Themeda triandra*, which are relatively drought resistant but will not stand intensive grazing, especially in view of the low rainfall. This type of land is occupied in part by Europeans who are practising stock farming and in part by pastoral native tribes. While the provision of paddocks of drought resistant grasses may assist the European stock owner in certain districts where the rainfall approaches the upper limit noted, the general solution of grazing problems, especially in the native reserves, appears to be the application of a system of rotational grazing applied on an extensive scale. By this means portions of each farm or of each native district would be rested periodically to permit of recuperation and seeding of the grasses.

RENOVATION OF PASTURES.

In certain areas overstocking, drought and locusts have separately or collectively produced considerable degeneration in the pasture. An experiment has been started, by the Grasslands Officer, at the Government Farm, Naivasha, to determine which are the most suitable methods to employ in order to renovate pastures of this nature.

The following methods are being compared:—

(1) The protection of an area by fencing. Surface cultivation and sowing of grasses and legumes.

(2) Surface cultivation and sowing of the species in an unprotected area. Replicated portions: (a) untreated, (b) burnt, (c) dressed with phosphate.

(3) The protection of an area of the degenerate pasture by fencing, a part surface cultivated by harrowing.

(4) An area of the existing degenerate pasture demarcated as a control, neither protected nor sown. Part surface cultivated.

In this experiment both indigenous and introduced species have been used. Attempts have been made to establish four grass species and six legumes. No results have been obtained up to the present owing to unfavourable droughty conditions which prevented the establishment of the grasses. The interesting work for reconditioning eroded native areas in the Machakos district is reported on in the section dealing with native agriculture (*see* the Report of the Agricultural Officer for the Central Province).

HAY AND GREEN FODDER CROPS.

The annual, Teff grass (*Eragrostis abyssinica*), and the perennials, Guinea grass (*Panicum maximum*) and Keria grass (*Panicum coloratum*), are useful hay grasses at both Kitale and Rongai. Rhodes grass has been mentioned previously.

At Njoro, in addition to Rhodes grass, Western Wolth's rye grass and Wimmera rye grass both produced a hay crop of about 30 cwt. per acre in about eighty days. European hay grasses are of value at Molo. Commercial Cocksfoot (*Dactylis glomerata*) gave two cuts of about one ton of hay per acre during the year. The New Zealand pedigree strains were even better. Italian rye grass (*Lolium italicum*) gave well over a ton at each of two cuttings. Another grass which did well was Meadow Fescue (*Festuca elatior*), of Danish origin. This made heavier growth than Italian rye grass. Tall Oat grass (*Avena elatior*), both English and Danish strains, is also a promising hay grass. Purple vetch (*Vicia atropurpurea*) and possibly Hairy vetch (*Vicia villosa*) and Hubam clover (*Melilotus alba*, var. *annua*) are all potentially of value to provide leguminous hay or green fodder at Njoro. Rongai and the Trans Nzoia. The Purple vetch and Hubam clover should be cut, however, before they are too woody. *Melilotus officinalis* (var. *Albotrea*) was mentioned as of value at Rongai, both for hay or as a green fodder. For green fodder or as hay the lucerne varieties Hairy Peruvian, Provence and Tagerim are desirable at the three centres, Kitale, Njoro and Rongai. The first variety is the tallest growing lucerne but tends to become rather woody and does not stool as well as the other two. The Trans Nzoia has rather a high rainfall

for successful cultivation of lucerne and the drier climate of Njoro and Rongai is more suitable to the crop; thus, in addition to the varieties of lucerne mentioned above, the Grimm, Kansas, Common, Montana Common and Cossack varieties have been grown successfully in the latter areas. Elephant grass (*Pennisetum purpureum*) made further advances in popularity as a green fodder, dry-season grazing or silage crop in the Trans Nzoia and it is stated that it may be cut for green fodder throughout the year in the Machakos district, where the annual rainfall only amounts to 22 inches. Even at the Plant Breeding Station, Njoro (7,100 ft.), Elephant grass is an extremely useful crop to plant for the provision of forage in the dry season.

Panicum trichocladum has been found to be a useful grass for green-soiling in the Trans Nzoia.

Soya beans.—The varieties Ootoan and “Ka Lu A” (E.B. No. 3 of the Federated Malay States) were grown at Njoro and the latter was thought to be the more suitable for fodder as it gave a better bulk. Experience in the Trans Nzoia is, however, that the stems of this Soya bean are too woody to make good hay and the crop might be better used as silage.

Pampas grass (*Gynerium argenteum*), yielded satisfactorily at Njoro in spite of the season, and was found highly palatable to cattle.

Edible Canna (*Canna edulis*) was not found palatable to cattle either in the Trans Nzoia or at Njoro.

EXPERIMENTS WITH SILAGE.

In the Trans Nzoia area maize is the best and easiest silage crop to grow, while Elephant grass may be cut during the rainy months and conserved as silage for the dry season.

As the results of trials at the Plant Breeding Station during 1934 it appears that an oat and pea mixture is likely to be the most suitable crop for silage in that district. Algerian Oats at 45 lb. per acre and P.B.I.P.50 field peas at 65 lb. per acre were used, but as the oat was rather too slow it is intended to try a short term rye for the purpose. A mixture of oats and purple vetch may be successful as a silage crop, but further experiments are required to determine the best seed rates and husbandry methods to adopt.

Experiments were carried out on the making of silage using $\frac{1}{2}$ to 1 per cent cane sugar molasses, watered in solution

in the material to be ensiled. A very palatable light acid silage was produced with the minimum of waste and this practice can be thoroughly recommended.

ROOT CROPS AND MISCELLANEOUS FODDER CROPS.

MANGOLDS.

Trials of mangolds were made in the Trans Nzoia and it was found that the root planted on July 11th provided most acceptable succulent food for cattle at the end of January. The mangolds were very drought resistant and could be left in the ground till required for feeding. The Yellow Globe variety gave the largest roots, the finest root being 2-3 inches in circumference and weighed $12\frac{1}{2}$ lb. The red Intermediate and Perfection varieties also were very successful. A poor stand and consequently low yields were obtained at Njoro and the desirability of a moist period during and for several weeks after germination of such root crops must be emphasized.

SWEDES AND TURNIPS.

Several varieties of turnips and swedes were grown in the Trans Nzoia. There does not seem to be a place for turnips in a mixed farming scheme in this district since the crop is attacked severely by beetles and caterpillars, while such roots as come to maturity must be used at once or they rot in the ground. Clamping is impracticable in a warm climate. The best swede was a Danish variety, Bangholm Purple-top, No. 4056. The swedes did not suffer from insect attack and were a month later in maturing than the turnips so that they were ready for use in December. However, if roots are to be grown as a dry-season succulent food, mangolds are preferable. These crops do not seem to be worth growing at Njoro as it is impossible to be assured of a good stand and that the crop will not suffer severely from insect attack.

KALES, RAPE AND CABBAGES.

These species of Brassicae need conditions of fairly high fertility and ample rainfall. Rengai proved to be too hot and dry for successful growth of kales and cabbages but the thousand-head variety of kale was the most drought resistant. These crops grew very slowly at Molo. In the Trans Nzoia the cabbages suffered from the ravages of insects, especially in drought. Transplanting the young plants from a nursery might be a better method of establishing a small acreage of

these crops but they are not so drought resistant as mangolds. However, kales, rape and cabbage were appreciated by young stock which could not be induced to eat roots.

Thousand-head and marrow-stem kale grew well at Njoro and were the most suitable of these crops but growth of cabbages was poor. Giant rape suffered from attack by saw-fly and a poor stand was obtained. It is doubtful whether succulent fodder cannot be supplied more cheaply on the farm than by growing crops of this nature.

PYRETHRUM.

Pyrethrum is likely to form an extremely useful cash crop in small acreages at the higher elevations of 7,000 ft. to 9,000 ft. with a good rainfall. Yields up to half a ton per acre have been obtained in the more suitable districts and this, coupled with the exceptional high pyrethrin content of Kenya grown pyrethrum, which gives it a premium in price over Japanese pyrethrum is likely to place Kenya in a prominent place as an exporter of pyrethrum.

The crop is not so successful at the lower elevations but attempts are being made at Njoro to improve the crop by breeding more prolific plants. No viable seed was obtained as a result of attempts at selfing but a number of crosses were successfully made. Similar work is being done at Kabete, but because of the low altitude for this crop, the work is likely to be discontinued and a fresh start made at Molo.

ESSENTIAL OILS.

Work on essential oils was continued by the Chemical Section. Several thousand cuttings were issued for propagation from selected varieties of geranium and trials with peppermint and lavender are continuing. It was found that geranium oil distilled after a long period of drought was of far better quality than that distilled after a period of rain and only in the case of one variety was the yield reduced.

A grant was obtained from the Colonial Development Fund for the purchase and installation of an essential oil plant which will enable improved work to be carried out and on a semi-commercial scale.

POTATOES.

VARIETY TRIALS AND SELECTION WORK.

Seven varieties of potatoes were given a proper yield trial. The best were Kerr's Pink, Kikuyu Queen and Incomer in that order. Yields were seriously reduced first by drought

and later by a severe infestation of Early Blight. As the disease broke out during the only wet period in the growth of the crop it was impossible to spray effectively against it. Kikuyu Queen, however, showed marked resistance to the disease but only obtained second place for yield as the proportion of ware potatoes was about one-twelfth of the crop instead of about one-third as with the other varieties. This result strengthens the case for individual plant selection work which is being carried out on this variety from seed obtained from the Scott Agricultural Laboratories.

VIRUS RESISTANCE TRIAL.

The yield and other trials with potatoes showed that all varieties have degenerated badly at Njoro owing to virus disease and the trial for resistance to virus conducted there was of considerable importance. A full account of the experiment appears in the report of the Agricultural Officer, Njoro, and it is clear that seed grown at a higher altitude is greatly to be preferred to seed once grown at Njoro.

CULTURAL EXPERIMENTS.

A comprehensive spacing trial of potatoes was undertaken at the Scott Agricultural Laboratories with spacings varying from 3 ft. between rows and 2 ft. in the rows to 2 ft. between rows and 1 ft. in the row. Spacings of $2\frac{1}{2}$ ft. x 1 ft. and 2 ft. x 1 ft. gave superior yields and the percentage of small potatoes were only very slightly larger. In more suitable districts with a higher rainfall this slight disability would be converted into the advantage of a more uniform and marketable commodity than is usually the case.

A fertilizer trial at Njoro, using sulphate of ammonia and superphosphate, demonstrated that nitrogen only produced an economic return.

LINSEED.

Further variety trials of linseed were made both at the Plant Breeding Station, Njoro and the Trans Nzoia. At Njoro the eight varieties given a preliminary trial last year were given a statistical trial this year. Yields were low due to the exceptional dry conditions but from results it would appear that the three varieties Redwing, Persian Gulf and Morocco are best suited to Njoro conditions, and that the varieties Ottawa, Rio, Bison, La Plata and Bullmoose are not worth further trial.

Four varieties from Pusa were also given a trial and yielded remarkably well but owing to the shortness of their straw will present difficulties in harvesting on a large scale.

In the Trans Nzoia a number of varieties including those from Pusa were given a preliminary trial. The Pusa varieties though their straw was very short appeared best suited to the dry climatic conditions of the year.

It is doubtful whether linseed will prove a remunerative cash crop but it is useful as a food for calves or other stock or alternatively for the wheat farmer when resting "Take-all"-infected lands from wheat.

PULSE CROPS.

MARROWFAT PEAS.

This type of pea does well at the higher elevations and a number of experiments have been undertaken in past years to find the best variety and the cheapest and most economic method of turning out a sample fit for sale in London as well as locally in the form of green packet peas. The choice had been narrowed down to Dutch Marrowfat, Japanese Marrowfat and Harrison's Glory, and an accurate yield trial of these varieties was made at Njoro. The method of harvesting adopted was to pull the plants when the bottom pods were beginning to turn yellow, and at once place all the haulm in a maize crib, leaving a space at one end to facilitate the turning of the slowly drying straw. It was necessary to turn the mass every two to four days and drying took three or four weeks before the samples were ready to thrash.

The method of harvesting and treatment was successful resulting in a high percentage of peas of good quality and colour with a minimum of hand picking. The samples were sent to London for report and the Dutch Marrowfat were valued at £18 per ton c.i.f., the Harrison's Glory at £17/5/0 and the Japanese at £14. Since the Dutch Marrowfat yielded far better than the Harrison's Glory and were valued much higher than the Japanese, they can be confidently recommended as the most suitable variety. Marrowfat peas are a useful high-priced crop, at the higher elevations, suitable in small acreages for farmers who have the facilities necessary for drying and who intend to take the trouble to prepare the peas properly for a competitive market.

DWARF BEANS (*Phaseolus vulgaris*).

No further trials of beans were made in the Trans Nzoia during 1934, but trials were continued at Njoro and Rongai. Eleven varieties were grown in the plots at Rongai, and the Agricultural Officer, Nakuru, states that the "White H.P. haricot bean was very drought resistant and fairly prolific, yielding 3.15 bags per acre. The White Sugar bean, which gave 3.93 bags per acre was outstanding and suffered least from bacterial blight.

Some selections of plants of Canadian Wonder beans for resistance to bacterial blight was carried out at Njoro. As well as ten other varieties of *Phaseolus vulgaris* fourteen varieties of canning beans were tried and the five most promising varieties, from the cultural point of view were:—

Keeney's Stringless Green Refugee.

Stringless Refugee Wax No. 176.

Refugee 1,000 : 1 Stringy No. 24.

Stringless Refugee Wax No. 35.

Early Refugee Stringless No. 173.

HORSE BEANS (*Vicia faba*).

Trials of horse beans were a failure owing to drought in the Trans Nzoia and Rongai. Four Egyptian strains, Ribayas 7, 8, 19 and 23, gave extremely promising results and the trials are being continued as a potential valuable source of protein feed for cattle.

NJAHI (*Dolichos lablab*).

Twenty bush varieties of Njahi imported in 1933 from the Madras Presidency were planted in the Trans Nzoia and three varieties in Rongai. While the crops seems to be of little value in Rongai, the growth in the Trans Nzoia was excellent. Yields of from 5.6 to 7 bags an acre of high quality seed were obtained on plots of 1/20th and 1/40th acre in size on which the germination was only 40 per cent to 80 per cent of a full stand. The intention is to bulk up the seed in the hope that it will be of value for inter-planting maize as a green manure crop.

HORSE GRAM (*Dolichos biflorus*).

Twenty varieties of Horse Gram, also from Madras, were planted in the Trans Nzoia, and five at Rongai. This crop was not a success in either district, but it is very drought

resistant and might be of some utility as a food crop in the drier areas in the native reserve at low altitudes. The highest yield recorded in the trials in the Trans Nzoia was 2.30 bags per acre.

SMALL GRAIN CROPS.

Several varieties of barley were grown at Njoro and Rongai. Chevalier turned out the best at Njoro but the dry conditions at Rongai did not favour English varieties; the Palestine and Greek varieties introduced from Egypt did best there, giving high yields of good quality and showing marked resistance to rust.

Attempts are still being made to find an oat which will grow well and give a good sample of grain. At the higher altitudes grain samples are usually poor and rust does considerable damage whilst at the lower altitudes yields are not good and the grain is thin.

MISCELLANEOUS CROPS.

SANTONIN (*Artemisia maritima*).

This crop grew well at Njoro in spite of the drought and shows promise. Transplants from Njoro were taken to Molo and flowered in five months. In the latter district the prospects of santonin seem particularly hopeful. The species *Artemisia brevifolia* is also being tried at Njoro.

CASCARA (*Rhamnus purshiana*).

Cascara plants grown initially in a nursery bed at Njoro made good growth during the year at both Njoro and Molo.

WORMSEED (*Chenopodium ambrosoides*).

This crop made little growth at Njoro on account of the drought, but its oil content appeared to be high so that a further trial was thought to be justified.

SOIL RESEARCH.

MANURES.

The Soil Chemist reports the fertilizers analysed during the year consists mainly of waste farm materials, local animal by-product manures, wood ashes, limestones, guanos and mixed fertilizers. It is pleasing to record that much more attention is now being paid to the utilization of local manurial by-products. The suitability of bone meal and carcase meal

for the red coffee soils is being realized and the demand for these materials has resulted in their commercial production as an established local industry.

The limestone survey has been continued and has shown that local deposits of fair to high quality limestone occur throughout the Colony. The district with the least suitable local supplies is the Trans Nzoia, but arrangements have now been made so that this important arable area may obtain relatively cheap supplies from outside sources. Field experiments now being undertaken by the department should in the near future give a better idea of the economic role of liming in the arable districts.

SOIL CLASSIFICATION AND NOMENCLATURE.

The Soil Chemist states that in conjunction with the Senior Agricultural Chemist a tentative universal soil classification based on broad climatic soil types has been suggested for the better known parts of the Colony. Such a map on a scale of 1 : 1,000,000 has been submitted to the Third International Congress of Soil Science for inclusion in a World Soil Map. The main natural soil groups described are the Light Coloured Plains Soils, Black and Grey Earths, Calcareous Black Earths, Non-Calcareous Black and Grey Earths, Laterised Red Earths, Non-Laterised Red Earths, Volcanics and Alluvium.

A second system of soil survey and classification has been carried out with much more detail. Up to the present some thirty-three Soil Series, most of which re-occur in various parts of the Colony, have been described and representative profile samples taken. All such soil samples are recorded under a double index system. There is a district classification in which is noted the locality, altitude, rainfall, natural vegetation, extent of occurrence and agricultural characteristics of the different soil series. Again, there is a series classification recording parent material, soil colour, mode of formation, field texture, topography, soil-water conditions, profile development, depth of sampling and any laboratory analyses carried out. This method has since been adopted for general use throughout the East African Territories.

During the year the Department has initiated a reconnaissance survey of the severity and extent of soil erosion. Arbitrary divisions of the intensity of erosion have been decided upon, thus putting the survey on a uniform quantitative basis throughout the Colony. This Kenya scheme has

been approved by the Conference of East African Agricultural and Soil Chemists and has been recommended for consideration by the Governments of the other territories.

SOIL EROSION.

During the year an increasing appreciation of the evils of soil erosion became evident amongst the farming community; the heavy but late rains falling on the bare fields in various districts helped to drive home a painful lesson.

A Farmers' Day was held by the Department of Agriculture on October 2nd on the farm at Hoey's Bridge of Messrs. Barnes Bros., the pioneers of Mangum broad-base terracing as an anti-erosion measure in Kenya. An appreciative audience of thirty farmers attended a lecture given by the Agricultural Officer on soil erosion and witnessed most instructive demonstrations of setting out and making terraces.

Arrangements were made and work begun on a demonstration of broad-base terraces at Mr. G. C. A. More's farm near Kitale. This demonstration, which is primarily for farmers of the Trans Nzoia district, will eventually occupy some 150 acres. Arrangements were also made for a terracing demonstration at the Plant Breeding Station, Njoro.

Press propaganda formed part of the campaign and a comprehensive bulletin on the subject, under preparation by the Senior Agricultural Chemist, is to be published early in 1935.

EXTENSION WORK.

The opportunity was again taken of the attendance in Nairobi of a number of representative up-country as well as local coffee planters at the annual Coffee Conference to organize Coffee Planters' Days at which lectures were given by officers of this Department and by officers of the Uganda and Tanganyika Departments of Agriculture on coffee problems. The lectures occupied two days and included a visit to the Scott Agricultural Laboratories where visitors were shown over the experimental work in progress. The meetings were well attended and those present benefited not only from the official addresses but also from the instructive discussions which followed each lecture in which experienced planters from all parts took a prominent part. The co-operation of officials and planters from other territories in these meetings was much appreciated.

A useful Coffee Planters' Day was also organized by the Agricultural Officer on the coffee plots at the small experiment

station at Kitale. The work there is at present in its infancy but over a hundred coffee planters found it worth their while to spend the whole day there.

Field days were held at the Plant Breeding Station, Njoro, and at the Molo and Rongai experimental plots. The wheat breeding work is always of considerable interest to farmers and much information is also obtained from the general agricultural investigational work conducted by the technical staff of the Division in the main European farming areas. A new departure this year was a field day held by the kind invitation of Mr. J. J. Toogood, on his farm near Nakuru. Mixed farming was the topic of the day and Mr. Toogood is to be congratulated on the practical exposition he gave of it.

The specialist and field staff of the Division staged instructive exhibits at the Agricultural Show held at Nakuru in December. A new departure there was the staging of the results of the Maize Seed Competitions in the produce shed. This took the place of past seed-cob exhibits and the opportunity was taken of staging this novel exhibit to give demonstrations of seed selection of maize and to show the results of faulty or slack selections.

NATIVE AGRICULTURE.

In presenting the reports of the Agricultural Officers in charge of the three Provinces in which the Plant Industry Division is working, it is desired in the first place to explain that an economic survey was made at the instance of the Chief Native Commissioner in 1931 and that in all these Provinces a complete plan for the work of development, based on the requirements both for food and cash crops has been in operation since. Each province is, for this purpose, divided into zones, the zone representing a distinct agricultural area based on natural conditions, and the particular crop to be advanced as well as the extent to which they should be encouraged, are specified. The policy of the Department is to prepare for each agricultural area a comprehensive plan of this kind to secure the assent of the Administration, thereupon the plan is put in the hands of all officers engaged in development work in the reserves. They are regarded as permanent plans, subject to change only by agreement between the Provincial Commissioner and the Agricultural Officer, so that whatever change there may be in personnel of the agricultural or administrative staffs in any district, no change of local policy can be brought about by the new officers.

In my 1933 Report it was stated that it would be possible in 1934 to give figures showing the substantial progress that had been made in the Reserves (progress which had been masked by several years of depression, locusts and drought). Unfortunately, the drought cycle and the locusts continued into 1934. Nevertheless, a further large increase in cotton production was brought about, as the following figures show.

COTTON LINT (IN LB.)

SEASON	Province	Production	Total
1930-1	Nyanza ..	296,080	—
	Coast ..	17,303	313,383
1933-4	Nyanza ..	2,276,370	—
	Coast ..	423,631	2,700,001
1934-5	Nyanza ..	2,882,502	—
	Coast ..	627,143	3,509,645

In the 1935-36 season it is confidently expected that the production will go well over 4,000,000 lb. (or 10,000 bales) and in next year's report it will be possible to include the Central Province.

The wattle bark production by natives in the Central Province is given in the following table:—

	1931	1933	1934
	<i>Tons.</i>	<i>Tons</i>	<i>Tons</i>
Dry Bark	9,600	10,800	12,900
Green Bark	—	—	3,780

The notable feature of the wattle bark work is the improvement in quality, brought about in two years, from the crude, unregulated quality which sold Sh. 30 per ton below Natal bark, to bark selling at about Sh. 5 per ton below.

The reports which follow show very clearly the measures adopted by the Division for progress in the native areas and the rate at which this progress is being attained. The salient features of development are as follows:—

(a) The opening of new cotton areas in all three Provinces (in the Central Province for the first time) and extensions of old areas, with a large increase in production.

(b) The swamp reclamation work in the Central Province.

(c) The improvement in quality of certain export products in the Central and Nyanza Province by means of organized inland inspection under Rules governing sale of inferior produce.

(d) The introduction of improved, superior-yielding strains and varieties of crops, including drought-resistant food crops for the areas subject to famine (in which particular success has been achieved).

(e) The commencement of native coffee-growing in the Central and Nyanza Provinces and of tobacco-planting for export in Nyanza.

(f) The extension of rice-growing in Nyanza, cashew-nut planting at the Coast, and of wattle-planting in the Central Province.

(g) The particular attention now being given to the prevention of soil erosion.

The accounts of experimental work being conducted in the native areas have been extracted from the Agricultural Officers' reports and appear in Vol. II of the Departmental Report.

H. WOLFE,
Deputy Director (Plant Industry).

REPORT OF THE AGRICULTURAL OFFICER IN CHARGE CENTRAL PROVINCE

The Province carries a population of 1,207,637 natives.

ADMINISTRATIVE.

(a) District Staff.

The following schedule shows the staff of Agricultural Officers and Native Agricultural Instructors in each district at the end of the year :—

DISTRICT	Agricultural Officers	Native Agricultural Instructors	
		Depart- mental	L.N.C.
Province and South Nyeri	Mr. W. G. Leckie ..	6	1
Kitui	Mr. N. D. Spranger	7	7
Kiambu	Mr. M. H. Grieve ..	7	—
Machakos	Mr. R. E. T. Hobbs	6	4
Fort Hall	Mr. P. C. Chambers	8	8
Embu	Mr. D. H. Cairns ..	8	1
Meru	Mr. E. L. Bradford	5	1

Additional Agricultural Instructors were taken on for short periods at intervals during the year to help in campaigns and seed issues.

(b) Provincial Organization.

The organization commenced late in 1932 continued to prove of great value in furthering schemes for development and marketing and directing and co-ordinating the work of the various districts. Continuity of policy is maintained by means of permanent programmes of development work concentrated on definite lines throughout the Province.

2.—SEASONAL CONDITIONS.

Most erratic weather conditions were experienced over the whole Province and rainfall varied from 3 inches to 13 inches under the ten year average, in different parts of the Province. The long rains did not break properly until the end of April and the short rains were very poor, no really heavy rain occurring until the beginning of December. In the lower parts of the Province drought conditions obtained throughout the year, the areas most seriously affected being the lower parts of Kitui, Machakos and Embu.

(c) Diseases and Pests.

Swarms of red locusts were reported in parts of Machakos, Kitui, Embu, Kiambu and Fort Hall Districts. The only swarms that did any damage were those in Machakos where laying took place. Hoppers emerged in April and were dealt with by swatting under the direction of Locust Control Officers.

The lady beetle and the snout beetle did considerable damage to cereals, potatoes and legumes, in Meru and South Nyeri District.

Stalk borer and cut worm are always prevalent, but the damage done by these pests is never very severe.

3.—LOCAL NATIVE COUNCIL SEED FARMS.

The following schedule shows the seed farms and experimental plots in operation.

DISTRICT	Seed Farm	Acreage	Altitude	Experi- mental Plots
			<i>Feet</i>	
1. S. Nyeri	Nyeri	30	5,900	—
	Giehiehe	8	6,800	—
2. F. Hall ..	F. Hall	50	4,500	3
	Wakema's (Experimental) ..	..	7,300	1
	Githua's (Experimental) ..	..	6,500	1
3. Kiambu	Kamiti	24	—	1
4. Embu ..	Embu	34	4,400	9
	Keruguya	10	5,000	—
5. Meru ..	Meru	18	5,400	—
	Chuka	21½	5,000	5
	Iringa	10	4,600	—
		..	..	..
6. Machakos	Machakos	45	5,300	—
	Masii	10	4,400	8
	Matilika	6	3,600	—
7. Kitui ..	Ithekwe	25	3,200	4
	Ndele	10	—	—

It is unfortunate that the value of seed farms is only now becoming fully recognized. At the time when these farms were opened, great difficulty was experienced in obtaining land and in many cases inferior land had to be accepted. Although the demonstrational value has been great in working the land up to a state of fertility, still the main function, that of bulking seed for issue, has been delayed and curtailed.

The large number of seed farms which it has been found necessary to open is due to the high cost of transport and the extremely wide range and variety of climatic conditions obtaining over the Province, or even in any one district.

Demonstration work has mainly dealt with upkeep of soil fertility and prevention of soil erosion. Methods demonstrated are mixed farming, terracing and the planting of wash stops.

5.—NEW CROPS.

The following new crops have been introduced during the year and show promise of becoming important :—

- (1) Cotton.
- (2) Coffee.
- (3) Victoria white peas.
- (4) Groundnuts.

The crops mentioned above are all listed as cash crops and their introduction into cultivation should greatly add to the future prosperity of the reserves.

New food crops under trial are Duram, Menade and Guam Maize and Groundnuts for the lower areas. Before leaving the subject of new food crops especial mention must be made of the early maturing sorghums and the awned bulrush millet which were introduced and which are now being bulked and issued to natives. Both of these crops are most popular and the sorghum, when fully introduced into the lower areas of Embu and Meru, should provide the finest insurance against famine these natives have ever known.

6.—SEED DISTRIBUTION.

In the programmes of work for each District details of seed issues have been laid down. In order to insure results, bulk issues of seed are made location by location in rotation. Propaganda is spread in the selected location a month or more before the seed issue is to be made. Issues are made from hut tax lists, Itura by Itura. A large staff is required for a few days to see the seed properly planted, to avoid use of old seed, and this large staff is produced through the valuable co-operation of the Administrative, Medical and Education Departments.

With the object of increasing the supplies of seed available from seed farms, selected natives are issued with good seed which is bulked by them and bought in for re-issue at the time of harvest. In dealing with maize, whole cobs only are purchased, so that quality can be assured.

The following schedule shows the quantities of seed issued from Local Native Council and Departmental Funds.

SEED DISTRIBUTION

DISTRICT	IN BAGS OF 200 LB.						IN BAGS OF 180 LB.						IN BAGS OF 200 LB.						FRUIT TREES				
	MAIZE			BEANS			POTATOES			PEAS			PIGEON PEAS		SORGHUMS		GROUNDNUTS		SIMSIM		WAT-TLE	Govt.	Seed Farms
	Govt.	L.N.C.	Seed Farms	Govt.	L.N.C.	Seed Farms	Govt.	L.N.C.	Seed Farms	Govt.	L.N.C.	Seed Farms	L.N.C.	Seed Farms	L.N.C.	Seed Farms	L.N.C.	Seed Farms	L.N.C.	Seed Farms	L.N.C.		
t Hall ..	—	40	20	10	17	30	—	—	20	3	—	—	—	—	—	—	—	—	—	—	—	—	—
Nyeri ..	5	—	19½	10	—	47½	—	—	126	—	—	—	—	—	—	—	—	—	—	—	—	—	—
u ..	—	—	4	—	—	9	—	—	10½	—	—	—	—	—	—	—	—	—	—	—	—	—	—
dhakos ..	1	—	220	—	50	—	—	—	20	2	50	—	—	16	—	2	20	—	70	—	—	6	260
ui ..	½	2	11½	1	—	—	—	—	—	—	—	—	—	—	1	—	1	9½	—	—	—	—	—
bu ..	—	—	—	10	21	—	—	30	129	—	—	5½	—	—	—	5	—	—	—	—	20	—	488
mbu ..	2	—	—	5	—	—	30	—	—	5	—	—	—	—	—	—	—	—	—	—	—	—	—

In addition to the above, small quantities of numerous varieties of seeds and plants have been issued to selected natives.

Issue of Tree Seedlings.

130,300 tree seedlings were issued from Local Native Council nurseries, which are supervised by Agricultural Officers.

7.—IMPROVEMENT IN QUALITY OF PRODUCE.

In these days of low commodity prices, it has been found more than ever necessary to improve and maintain the quality of the more important commodities produced in native reserves.

A full report on the methods adopted to improve the quality of wattle bark was given in the Annual Report for 1933. The services of inspection inaugurated in that year were maintained in 1934 and amply repaid the small cost placed on the industry to cover expenses.

In order to improve the quality of maize and legumes, Agricultural Produce Marketing Rules were brought into force over the Province in October. Under these Rules action was taken against twenty-six traders and convictions were obtained in all instances.

As a result of the success attending the system of inspection instituted for wattle bark in 1933, it was reasonable to suppose that a similar improvement should be obtained as a result of inspection of maize and beans. The Government deferred the compulsory central inspection proposed, and trial voluntary central inspection was opened in South Nyeri on the first of November whereby traders agreed to purchase maize only after inspection and when accompanied by a pass ticket. The cost of the services, amounting to not more than 5 cents per bag, was to be paid for by traders themselves. There was an immediate improvement in the quality of the produce accompanied by a rise in price of 35 cents per bag to the producer.

Soon after central inspection had been proved practicable, Indian traders asked that it should be extended into Embu and Fort Hall districts. Owing to the large number of market centres in these districts it was found impossible to institute the voluntary system begun at Karatina. Inspection after sale and before shipment from large trading centres, was therefore put into operation and functioned fairly satisfactorily.

There can be little doubt that from the point of view of both Government officers and traders a system of compulsory central inspection is preferable to constant petty prosecutions under Rules. A positive result is obtained in the one case and outside buyers are assured of a reasonably good product. Without compulsory inspection there can be no assurance that all consignments are good and buyers must cover themselves against possible rejections and losses.

Issues of proved varieties of seed are also having the desired effect on the type of produce emanating from Native Reserves.

As a result of the measures taken for improvement of quality of produce very real progress has been made. In support of this statement it is creditable to note that before inspection the difference in price between Natal and Kenya wattle bark was as much as Sh. 30 per ton, now the difference is only between Sh. 5 and Sh. 10 per ton.

8.—MARKETING.

The marketing of wattle bark, so far as it applies to wholesale buying, is now well organized. There are only two big buyers operating in the Province, namely the Natal Tanning and Extract Co., Ltd., and the Kenya Tanning Extract Co. Both of these companies have large factories at Thika capable of dealing efficiently with the whole output of the Province. These companies have buying facilities at the various railway stations.

The marketing of wattle bark in the reserves is not yet properly organized and haphazard buying all along the roads and paths by native traders is not conducive to the producer obtaining a fair price. Steps were taken in the districts of Kiambu, Fort Hall and Nyeri to make all traders take out licences for the buying of wattle bark under existing legislation. It is understood that the aim of the Department is to confine buying to definite centres in the reserves. Only in this way can a stop be put to unfair dealings and trickery.

(b) Local Native Council Marketing.

The Local Native Council marketing system reported on in 1933 continues in operation, with Messrs. Gibson & Co., Ltd., as agents. The agents have again found it impossible to buy any produce in bulk with the exception of wattle bark.

The following quantities of produce were purchased through the Local Native Council stores during the year :—

	1932	1933	1934
Wattle Bark	503 tons	6,456 tons	6,222 tons
Maize	Nil	Nil	152 bags
Beans	Nil	Nil	177 „
Potatoes	Nil	Nil	130 „

(c) *Marketing—General.*

It is considered that there is a pressing need for the control of the marketing of native produce, especially in the native reserves. The numbers of native traders are increasing each year to an alarming extent and the majority have little capital on which to run a legitimate business in a market place. These traders are mostly parasites on the producer, making large profits on a small turnover. The situation has become absurd in that trading takes place all along the roadsides and the legitimate trader with a store in a recognized market is unable to obtain produce direct from the producer and has himself to move out and become an itinerant buyer. In order to put an end to this unsatisfactory state of affairs and also to protect the producer against undue victimization, a Native Produce Marketing Ordinance and a suitable standard measure are badly required. Endeavours are being made to introduce standard measures early in 1935.

9.—SOIL FERTILITY AND EROSION.

Loss of soil fertility, through erosion and lack of manure, is regarded as the most serious problem with which we have to contend. In the higher portions of the Province, situated on the slopes of the Aberdares and Mt. Kenya, the soil is of a light, friable texture and is very acid. These soils cover an area of approximately 300 square miles and are noted for their rapid loss of fertility when put under cultivation. The soils of Mt. Kenya and the Aberdares, although similar in behaviour under cultivation, differ as to the depth at which the sub-soil is situated. As reported under experimental work, good results have been obtained by deep ploughing on the slopes of Mt. Kenya. On the slopes of the Aberdares, however, the clayey sub-soil is situated at a depth of from 15 inches to 2 feet and cannot therefore be brought to the surface economically.

In the more densely populated areas of the Province, situated between 4,000 ft. and 6,000 ft., progress has been made in getting natives to manure the land and to plant up steep hillsides to wattle. Owing to the density of the population it is impossible for natives to keep large herds of cattle near arable land and the making of compost with village refuse and the dung from one or two animals is advocated. A campaign for the making of compost was undertaken in Embu and by the end of the year every village in the district had its compost pit in operation.

The solution to the problem of upkeep of soil fertility is obviously the small compost holding which has been demonstrated in various parts of the Province during the last few years. Although a large number of these holdings are to be seen in Kiambu district, where purchase of land outright is permitted, little progress can be recorded in other districts of the Province owing to insecurity of land tenure.

The aim is to run each seed farm on a self-contained mixed farming basis. The objects in this policy are to demonstrate the following : (a) upkeep of soil fertility ; (b) the carrying of the maximum head of cattle per acre through the judicious planting of fodder crops ; and (c) animal husbandry and dairying.

Much of the Kikuyu country must eventually be contoured if it is to remain in cultivation and demonstration strips of terracing have been carried out at Nyeri, Kiambu, Machakos and Fort Hall. Terracing is an expensive and laborious business and the cheaper, though not so efficient methods of stopping soil erosion by planting strips of Napier grass, wattle, sweet potatoes and grasses, are being put into operation as the most practicable system in the present state of native advancement.

Reconditioning.

With the completion of the area at Kiteta early in the year, work ceased on reconditioning demonstrations in Machakos district, but boundary guards were retained to keep stock off the reconditioned areas. There are now three treatments being tried on the Kiteta area, viz. :—

1. Destocking.
2. Destocking and contour trenching.
3. Destocking, contour trenching and planting with indigenous grasses.

Of these the latter has proved so far much the most successful and quickest.

In March, chiefly due to administrative persuasion, the natives in eroded locations started to fence in and contour trench small areas themselves and by May there were nearly one hundred of these in existence, including one of fifty acres in Kiteta location.

At a meeting of the Local Native Council in September the following resolution was passed :—

“That this Council in order to check and remedy the severe soil erosion which has taken place in the Machakos Native Reserve, directs that headmen of Kiteta and Masai locations be empowered to restrict or prohibit the use of grazing by any form of stock in their locations; which locations this Council have now set apart for the purpose of reconditioning and for the planting of fodder producing plants and grasses.”

Towards the end of the year it was decided to establish a prison camp in Kiteta location to provide a regular supply of labour for reconditioning work, as however commendable the voluntary work of the natives themselves might be, yet their efforts were very spasmodic and the type of trenches dug left much to be desired; the latter being chiefly due to the use of inefficient tools. It was felt that the presence, in their midst, of a European organizing the work might induce them to move their stock over to the Yatta, on which grazing is now free.

Without destocking of the areas, which are to be reconditioned, any work is bound to result in failure.

Small shambas were measured out at a number of villages in Kiteta for planting with Napier Grass and 1,500 bundles of this grass were sent to that location at the commencement of the rains. Owing to the partial failure of the rains, only about half the grass sent has been planted out, but the remainder still in the nursery, will keep for distribution next year.

A fodder tree Arboretum, which may prove useful in future reconditioning work, was established at the Veterinary Quarantine Station, Machakos, and the following species of drought-resistant fodder trees have been planted :—

Disperma trachyphyllus.

Acacia spirocarpa.

Brachychiton populneus.

Phytolacca dioica.

Australian saltbush.

Other species are being procured.

10.—NATIVE AGRICULTURAL TRAINING.

The training of Agricultural Instructors for the Province is carried out at the Scott Agricultural Laboratories and is reported on separately by the officer in charge.

Further courses of agriculture were in operation for instructors at Jeanes School, but these have been suspended as the results obtained were mostly incommensurate with the expense entailed. Co-operation between the Inspector of Schools and Agricultural Officers has continued and co-ordination of the policies of the two Departments has been advanced.

The teaching at the Provincial School, Nyeri, has been given an agricultural bias and an area of fifty acres was obtained for the school farm. The farm will be run on mixed farming lines and it is intended that pupils will be taught the use of implements, animal husbandry, dairying and general principles of good farming.

The report on the Training School at Kabete, by Mr. S. Gillett, now follows :—

TEACHERS.

Two native teachers were employed.

NATIVE APPRENTICES.

A.—*Native School.*

At the commencement of the year there were sixty-one pupils in residence. These were drawn from the following districts :—

Meru	...	...	...	8
Teita	...	...	...	5
Nyeri and Keruguya	...	...	...	11
Kiambu	...	...	...	13
Machakos	...	...	...	6
Fort Hall	...	...	...	5
Embu	...	...	...	4
Masai	...	...	...	5
Hiriana	...	...	...	1
Kitui	...	...	...	3

Sixteen pupils were engaged at the beginning of the year.

Twenty pupils passed out on completion of their course during the year; of these, fifteen obtained employment in the Department and five returned to their homes.

B.—*Education.*

Major alterations were made in the school curriculum. This was necessitated by the engagement of pupils of a post-primary standard. Vocational training has been deleted from the training of these boys and their syllabus now includes Theoretical and Practical Botany, General Science, Elementary Surveying and Building Construction, Book-keeping and Agriculture. The progress of the class throughout the year was most satisfactory and the results of the examination held at the end of their first year reflected the greatest credit on the senior native teacher upon whom the mass of the work fell.

Although considerable difficulty was experienced in obtaining post-primary boys to take up agriculture, the boys who were willing soon settled down to the training and their work, both in school and in the field, was excellent.

The value of this training has not yet been tested but it is honestly believed that the Field Officers will find that the type of pupil now undergoing training will be of much greater assistance to them than those who have been made Agricultural Instructors in the past.

The hours of work have remained the same, each pupil receives ten hours' instruction in school and thirty-five hours practical work in the field per week.

C.—*Field Work.*

In addition to carrying out all the field and experimental work conducted on the station, pupils received instruction in the running of a native small-holding, including care of stock, rotational grazing, care of poultry, ducks and pigs, ghee making and the value of boma manure on field crops, etc.

Each pupil also had his own small garden for which he was entirely responsible.

D.—*Excursions.*

Excursions were made during the year to the Karura Forest, Ngong Veterinary Training Centre and the Nairobi Municipal Abattoir.

E.—*Recreation.*

The annual athletic sports were held during October on the Nairobi Showground. We are once again greatly indebted to the Society for the loan of the ground.

Once again we were unable to obtain a suitable ground for football.

F.—*General.*

The health and discipline of all pupils in residence throughout the year was good. The form of self-government practised here continues to give excellent results

MAIN WORK IN HAND FOR NEXT YEAR.

Programmes of work for each district and agricultural zone have been prepared and the development of each reserve is organized. In addition to maintaining the activities already in operation the following work will be carried out and extended :—

(a) *Soil Fertility and Erosion.*

- (1) Village compost pits.
- (2) Planting of fodder crops for stock and to stop erosion.
- (3) Planting up of suitable hillsides to wattle.

(b) *Cotton Growing.*

(1) To extend cotton growing in Kitui and Embu districts.

(2) Experimental work on cotton in Machakos, Kitui, Embu and Meru districts.

(c) *Coffee.*

To plant up a maximum of 100 acres each, in defined areas, in Embu and Meru districts.

(d) *Wattle.*

To largely increase the areas under wattle in Nyeri, Fort Hall, Kiambu and Machakos districts and especially on the slopes of the Aberdares.

(e) *Hides.*

To erect sufficient shade-drying bandas to enable the Hides and Skins Rules to be applied.

(f) *Famines.*

To introduce quicker maturing crops into the famine areas.

(g) *Swamp drainage.*

To complete the drainage of all swamp land in Fort Hall district.

(h) *Marketing.*

To improve facilities for marketing and to introduce a standard measure of capacity.

(i) *Reconditioning.*

To recondition extensive areas in Machakos.

This is a very heavy programme of extension work and is only possible after careful experimentation and organization and with the strong support of the Administration.

GENERAL.

Good long rain crops were harvested over the upper parts of the Province and there were record supplies of maize for sale. This heavy surplus was due to largely increased areas under cultivation and to the improved yielding quality of the seed being planted.

The short rains were a partial failure over the whole Province and much of the surplus maize obtained in the long rains had to be held for consumption within the reserves.

Over the lower parts of the Province both rains were partial failures and famine relief measures had to be instituted towards the end of the year.

Great strides have been made in the improvement of the quality of produce exported from native reserves. It has been clearly shown that simple systems of inspection immediately produce the desired results with corresponding benefit to the producer.

(a) *Cotton.*

A cotton campaign was opened at Kitui in September and by the middle of November 1,795 acres had been measured out and cultivated, 25 tons of U/4 cotton seed were issued and 1,600 acres were planted.

It was unfortunate that the rains were late in breaking over the greater part of the cotton area and were almost a complete failure, so much so that few food crops have survived. In some areas where it was possible to carry out planting in October, cotton looks well and fair crops will be harvested. Great credit reflects on the District Commissioner and Agricultural Officers concerned, in getting 1,600 acres of cotton planted as a first venture, over a sparsely populated country and in dealing with backward natives.

A ginnery has been erected at Kitui and it is intended that increased areas will be planted to cotton in 1935.

It is probable that a cotton campaign will be started in Embu district early next year and that cotton growing will be extended to Machakos on the one side and Meru on the other side, in 1936.

The introduction of cotton throughout the lower parts of the Province will undoubtedly lead to great economic development of the native reserves concerned and should materially help the Colony as a whole.

(b) *Coffee.*

Coffee nurseries were established at Embu and Meru and seedlings sufficient to plant up 200 acres will be available in 1935. Coffee areas in both districts have been defined under the Native Grown Coffee Rules.

(c) *Swamp Drainage and Cultivation.*

Approximately 8,000 acres of swamp land have been, or are in process of being drained in Nyeri, Embu and Fort Hall districts. This drained swamp land is exceptionally rich and is now the most valuable land owned by natives. Good crops of roots are being obtained in spite of droughts and the texture of the soil is improving rapidly under cultivation.

(d) *Hides and Skins.*

A chain of Local Native Council shade drying sheds are in operation in Machakos and Kitui districts. A similar chain of sheds are being built in Meru district. In other more advanced districts the policy is to get individual natives to erect their own sheds and to sell their hides direct to reputable firms. This last system is most successful and relieves the already over-burdened agricultural staff of much petty accounting and supervision. Total figures for shade dried hides produced are not available for all districts of the Province.

Kitui produced	...	...	7,381 hides.
Fort Hall produced	...	...	7,450 „
South Nyeri produced	...	...	4,900 „

In Meru where shade drying was commenced late in the year there was an immediate local premium of Sh. 2/50 to Sh. 4 per frasila over sun-dried hides.

(e) *Ghee.*

The ghee factory at Muthara, in Meru district, was opened and functioned for eight months, producing 3,888 lb. of ghee.

In dealing with ghee, the best system would appear to be one of private individuals running separating plants at centres through the reserves. The Local Native Councils as a rule cannot afford to erect and operate a large number of separating plants, with the result that women have to travel long distances with their milk and wait many hours in order to get back the separated milk. Natives also prefer payments to be made in cash as opposed to monthly payments.

A few natives have been persuaded to buy separating plants and small churns and it is anticipated that the individual ownership of these machines will spread.

(f) *Live Stock.*

Serious outbreaks of rinderpest occurred in Meru district, taking a heavy toll of cattle. Grazing has been short due to drought, with the result that the year has been a bad one in which to start ghee production. As already reported efforts are being made to introduce fodder crops so that cows "in milk" can be kept near the villages.

(g) *Poultry.*

The issue of Local Native Council cockerels continues to give good results and breeding pens are established at Nyeri, Fort Hall, Kiambu, Embu, Meru and Machakos.

(h) *Beeswax.*

Efforts are being made to improve the quantity and quality of beeswax, through the introduction of a simple and cheap type of bee-hive evolved by Mr. Bailey, of Head Office.

(i) *Forestry.*

Tree and fruit nurseries are run in conjunction with seed farms, in all districts where there is no officer of the Forestry Department available for the work. In the main the service is confined to the growing of citrus fruits, and tree seedlings suitable for issue in the de-forested and drier ports.

(j) *Wattle.*

In the higher areas of the Province, wattle is much the most economic tree for the native to grow, supplying him as it does with building poles, firewood and valuable bark.

During the past two years these trees have suffered from shortage of rain and made very poor growth and many new plantings have been lost. Every effort is being made to increase the area planted to this crop and to make up for the lost years. The area under wattle in Kiambu, Fort Hall, and South Nyeri districts is estimated at 45,000 acres. The production of wattle bark from native reserves was as follows :—

	1933	1934
	<i>Tons</i>	<i>Tons</i>
Dry Bark	12,000	12,922
Green Bark	—	3,780
	12,000	16,702

(k) *Implements.*

Animal draught implements are not of much use to the Akikuyu with their small fragmented shambas and hilly country. In Ukambani the use of implements is increasing rapidly and there are already 600 ploughs in use in Machakos district.

(l) *Transport.*

In the Kikuyu country with its great variety of climatic conditions oxen do not stand up to the different type of feeding necessitated in transporting produce from the higher areas down to the lower railway centres. Pack donkeys have, however, been found invaluable for transport work and their numbers are increasing rapidly. These animals are being demonstrated in draught in cultivators and carts on seed farms. These demonstrations have attracted much attention and already native-owned carts are to be seen on the roads.

CONCLUSION.

1934 can be recorded as a year of very real progress in all aspects of agricultural work. Natives are becoming more and more willing to carry out the advice of the agricultural staff, a start has been made in manuring the land, better seed is being planted, better spacing of crops is adopted; all resulting in higher yields. The areas under cultivation and the quantity and quality of wattle bark and maize produced have been higher than ever before. In the Embu division, which three years ago was regarded as a non-exporting area, one sees hundreds of tons of maize being sold and transported to rail-head. From reliable figures obtained from buyers of produce,

it appears that a record quantity of 240,000 bags of maize has already been purchased in the Kikuyu Native Reserves since August. In order to get an idea of the whole season's output, one must add to this figure direct sales by natives to settled areas and to Ukambani and also the quantities still remaining for sale. Machakos district produces 60,000 to 70,000 bags of surplus maize in a normal year, so that a saleable surplus of 500,000 bags is a reasonable figure to aim at for the future.

With the introduction of such economic crops as cotton and coffee, production will increase rapidly. A great deal of spade work, however, has still to be done in developing the newer areas and in maintaining fertility and exports in the older areas. With an established agricultural programme of provincial development in operation, one can look forward with confidence to the future.

ACKNOWLEDGEMENTS.

In concluding this report I would mention the zeal put into all work by the staff of Agricultural Officers under my supervision. Without the whole-hearted co-operation and support of the Administration much of the progress reported could not have been made.

W. G. LECKIE,

*Agricultural Officer,
Central Province.*

REPORT OF THE AGRICULTURAL OFFICER IN CHARGE NYANZA PROVINCE

1.—EUROPEAN STAFF.

Province.—Mr. W. Lyne Watt, responsible for part of Central Kavirondo, Lumbwa and Nandi.

North Kavirondo.—Mr. T. Y. Watson. Mr. W. O. Sunman reported from home leave in October and was additional till the end of the year.

Central Kavirondo.—(Zones 1, 2, 3 and 4) Mr. M. D. Graham, Assistant Agricultural Officer.

South Kavirondo.—Mr. E. W. Gaddum till 27th November, when Mr. M. Halcrow relieved him and took charge.

Bukura School.—Mr. J. E. P. Booth.

2.—NATIVE AGRICULTURAL INSTRUCTORS.

	Dept. of Agric.	Local Native Council	Provided by Ginneries	Total
Provincial Office, Kisumu ..	1	—	—	1
North Kavirondo	8	17	6	31
Central Kavirondo	14	17	3	34
South Kavirondo	10	26	5	41
Bukura School	4	—	—	4
	37	60	14	111

During the year the officers have been able to continue their work in accordance with the policy and plan laid down before the year commenced. There was excellent co-operation with other departments and results were gratifying.

With the native instructors, there was a big increase made from 45 in 1933 to 111 in 1934. The greatest change took place in South Kavirondo.

The Local Native Councils increased their votes for labourers, tree scouts and tree nursery labourers.

3.—SEASONAL CONDITIONS, CROPS AND PESTS.

There was a general shortage of rain throughout the Province, compared with average years, but it was unseasonable and caused the native planters to hesitate and miss their plantings.

PLACE	Rain, 1934	Average
	<i>Inches</i>	<i>Inches</i>
Kakamega	66.26	78.80 average over 10 years.
Bukura	66.48	63.35 average over 11 years.
Maseno	50.98	46.66 in 1933.
Kisumu	37.48	42.78 average over 5 years.
Kisii	59.51	67.57 average over 10 years.

The Agricultural Officer, Kisii, writes :—

“ . . . This rainfall must be taken as applying only to the Kisii section of the district; it definitely does not apply to the Luo locations where very dry conditions were experienced, particularly on the Lake shore. The severity of the drought conditions was aggravated by the fact that when rain did fall it was so heavy that run-off and erosion resulted causing considerable damage to growing crops.”

This same condition prevailed in similarly situated areas in Central Kavirondo. It was evident in the June-August cotton planting areas of Central and North Kavirondo that rain was inadequate and growth very sparse compared with the luxurious vegetation of average years.

(a) Cotton.

There has been a marked improvement in planting methods and in size of areas put under the crop.

1933-34 crop. Central and North Kavirondo was favoured with suitable weather during the growing season and ideal dry weather for the harvest. The harvest was short and the quality the best yet sold from Nyanza. Buying was very spirited and remained steady at cents 11 at the ginneries and cents 10 at the stores.

‘ A ’ Grade	5,996,489 lb.
‘ B ’ Grade	502,755 lb.

TOTAL 6,499,244 lb.

The following figures of seed cotton indicate the rapid progress made with cotton :—

1930-1 crop	918,967 lb.
1931-2	2,166,352 „
1932-3	3,940,764 „
1933-4	6,499,244 „
1934-5	7,682,637 „ (to 24-3-35)

1934-35 crop. Uganda border region. With the exception of Samia, fairly favourable weather prevailed immediately prior to and during the earlier part of the planting season. The area planted was estimated at an increase of 25 per cent to 30 per cent over the previous year. The area was also extended from the old boundary towards Mumias, South Kitosh and northwards in the Malakisi area. Again more propaganda was spent in the Ugenyas of Central Kavirondo and trial shambas made to the East in Buholo, South Wanga and North Marama. The latter zone was planted too late, and aided by the lack of rain, the results were void, but taught us a useful lesson on the need for early planting. All ginneries provided funds for extra native agricultural instructors. Harvesting will take place in 1935.

Planting was practically all done in rows, on the contour, spacing correct and the crop was well tended during its growth. Soil control methods were adopted in nearly all sloping fields by retaining the original soil cover and placing it between the rows of cotton. There was more keenness shown by the natives for the crop than ever seen by the writer before.

1934-35 crop. Kavirondo Gulf and Lake Shore areas of Central and South Kavirondo. Cotton has been grown spasmodically and in a half-hearted way throughout this region during the past few years. To give greater encouragement to the growers, a new ginnery was built at Kendu by Messrs. Small & Co., and did much to increase the confidence of the growers. The ginneries provided cash for the pay of five extra instructors for six months' duty in South Kavirondo.

In South Kavirondo the area was estimated at 5,500 acres planted on the block, or group-shamba system, each native having $\frac{1}{4}$ acre to care for. The measuring was done by the Agricultural and Administrative Officers, aided by the native cotton instructors. Some of these group shambas extended to fifty acres and more. This method greatly assisted supervision and teaching and did much to encourage the apathetic workers who saw the results attained by their more energetic neighbours. The whole of the effort was most commendable to all those who helped and in spite of a very adverse season the efficacy of the push may be seen by a comparison of the following figures of seed cotton :—

	'A' Grade	'B' Grade	Total
	lb.	lb.	lb.
1933-4 crop	54,794	16,158	70,952
1934-5 crop	479,956	444,292	924,248

Prices opened on October 15th at the ginnery at cents 10 per lb. rising to cents 11 on 10th December and again to cents 12 per lb. on 31st December. The price at the stores was one cent less per lb.

The new Gulf Shore areas of Central Kavirondo up to 28-2-35 were as follows :—

	'A' Grade	'B' Grade	Total
Port Victoria, Kadimu, Port Southby, Asembo, Kisumu and Miwani	262,888	185,118	448,006

(b) *Groundnuts.*

In North Kavirondo the lower lying western and south-western locations are suited to the crop and would make a very desirable crop in the rotation. Eighty-seven bags of seed were issued and efforts are being made to get the natives to increase their plots.

In Central Kavirondo the crop was a failure due to climate and lack of real interest amongst the growers. Asembo, the chief groundnut location, used all their seed for food and planted next to none.

In South Kavirondo coastal natives expended their energy on cotton and only planted small patches of nuts. The higher Luo locations there had good crops. Prices were again poor, ranging from Sh. 2/16 to Sh. 2/30 per frasila and quality excellent.

Rosette disease was practically absent.

(c) *Simsim.*

The 1933-34 crop was below average, with sale samples the best seen up to that date.

The 1934-35 crop decreased considerably in North and Central Kavirondo and it is thought chiefly due to a rumour which the natives believed that there was to be another substantial drop in price. There was also more interest being taken in cotton. The 1934 plantings in South Kavirondo were of record dimensions, with favourable weather, and a bountiful harvest was reaped. Prices were about Sh. 2/50 per frasila on the South Kavirondo coast and natives were well satisfied.

(d) Maize.

No crop has improved more in quality than maize during the last few years. It is now a novelty to see spotted cobs, and these are only met with in the non-maize exporting regions. There is a steady desire to improve and many natives now see that yields per acre can be increased by good seed.

The North Kitosh people, who had no grain exports in recent years, have been able to take advantage of the main railway line and increased their exports from 4,600 bags in 1932 to 15,000 bags in 1934.

The Maragolis and all regions around Butere Yala and Luanda have increased quantity of exports, as well as milling and selling to the goldfields and other local users.

The South Lumbwa natives are increasing their areas steadily but find difficulty in placing their surplus in a good market.

Improved seed is still being issued throughout the Province, mostly Muratha, and by another year there should be little difficulty in getting a steady K.2 quality from all the chief exporting centres.

Rail exports were as follows in tons :—

Butere	...	...	...	1,529
Yala	...	...	...	6,415
Luanda	...	...	...	4,529
Kisumu	...	...	...	2,695
Maize meal from Kisumu				6,956

(e) Rice.

There is a steady increase in the areas being planted in North and Central Kavirondo with a very little in South Kavirondo. The coastal people are using Mwanza Sena and those around Mumias are using their own upland type. During the latter part of the year, very large shambas were prepared in the Wamia Location in North Kavirondo, where rice was an important crop as recently as 1924.

(f) Coffee—Kisii.

The nursery has produced an abundance of plants for the programme, but up to date only eight acres were planted in Nyaribari. The varieties being tried are Gethin's, Kent's and Blue Mountain. There are several shambas in readiness for planting in 1935.

(g) Wheat.

There is a growing desire for more wheat and repeated calls are made for seed. In South Kavirondo the old-established industry rejuvenated to a certain extent and although their seed is mixed in type, there will be little difficulty in improving it by simple selection. Sabanero appeared to be the best in the seed farm trials.

The Kimilili natives of North Kavirondo are anxious to try wheat and the crop did well in the variety trials there. It is believed, however, that rye may suit them equally well for local food purposes and provide a much needed supply of thatching straw.

(h) Vegetables.

There is a real need for better and more regular supplies around Kisumu and the goldfields. In North Kavirondo alone 3,600 packets of seed were issued and large quantities were planted in reclaimed swamps, and near streams where water could be had during dry periods. Central Kavirondo and South Kavirondo were slower to catch this remunerative market. Onion growing increased slightly. Kavirondo natives are not yet sufficiently industrious for the more exacting needs of these crops.

(i) Trees.

Tree planting has again been urged, but it is most difficult to make the people realize that in timber they have a cash crop which is far more profitable than any other crop grown at present.

The Agricultural Officer, Kakamega, writes :—

“An increasing quantity of timber and firewood is being required by the miners and it is estimated that even half-an-acre of trees planted yearly would bring in a continued income of approximately Sh. 1,000 per annum in a few years after the commencement of the first planting of the trees.”

The transplant issues will be seen under seed issues; they were a big item, but are nothing to compare with the need and in consequence efforts were made to get the growers to make their own nurseries.

Wattle planting was given more time in the Tirikis and that part of Nandi adjoining Kavirondo, the Belgut and Buret in South Lumbwa and in the highlands of Kisii. Small progress was made.

In the lower and hotter regions, where white ants are also a menace, the following trees were planted by the natives, usually from seed collected by themselves:—

Cassia florida *Eucalyptus citriodora*.

Markamia hildebrandtii (Siala).

Parkinsonia aculeata (Midwele).

(j) *Kapok*.

This was planted out in the hotter regions, but drought claimed a high proportion. Some transplanting was done from seed beds, but direct sowing was generally practised.

(k) *Tobacco*.

The Agricultural Officer at Bukura spent some time in fostering this new industry in the Marama location. A total of over 4,000 lb. of cured leaf was sold at cents 25 per lb. first grade, and cents 15 for second grade. The natives were well pleased with the results and promised to give the crop a greater share of their time in 1935. Faults in our methods were seen during the various operations and will be avoided in 1935.

FOOD AND OTHER CROPS.

(1) *Wimbi* was difficult to germinate with the precarious climate in the spring, but on the whole, throughout the Province, the crops were good and record in some places.

Our new "Bukura" strain is being sought after, especially in North Kavirondo where an early heavy yielder will do so much to increase the cotton output, by being harvested in time to allow the cotton to be planted in the dug-over wimbi stubble.

This is an important cash crop in the Kisii highlands. Yields were good and quality the best yet marketed. Kisii trading centre alone exported 12,000 bags and natives were paid an average of Sh. 6/22 between August and September.

(2) *Mtama*.—Good crops throughout except in parts of the Lake and Gulf shore. The two new varieties "Kano" and "Dobbs" have been proved to be very early high yielders. They are being bulked in the seed farms and will fill a needed want for the dry regions and thickly populated location.

(3) *Pulses*.—Average throughout, with a heavy crop of choroko in all areas.

(4) *Roots*.—There is still an increase in planting, except in some Luo areas. During the period of food shortage in the first five months of the year, the cassava was of inestimable value and relieved the natives of much distress.

(5) Other new crops are linseed, Madagascar butter beans, P.O.J. sugar canes 2714 and 2878.

PLANT DISEASES AND PESTS.

(a) *Smut*.—In South Kavirondo all three forms were present in the mtamas, causing at least 10 per cent damage. In part of Kaniamwa several shambas had to be burned out without any crop being taken. The other districts had slight infection.

(b) *Rosette Disease*.—The whole groundnut crop was almost free from the disease.

(c) *Striga Weed*.—There does not appear to be any reduction in this curse. Great numbers of natives were fined, but they only look on the punishment as bad luck and believe that it is beyond human power to control it. They are lazy fatalists and leave such things in the hands of *Mungu* (God).

(d) *Bhang*.—Still grown throughout by many natives. Many were heavily fined.

(e) *Mexican Marigold*.—This weed made its appearance in Kabras and was burned and so far is under control.

(f) *McDonaldi Weed*.—This weed has spread rapidly in the last few years, but is more of a friend than foe in native areas.

(g) *Stalk-borer*.—Evident chiefly in the ratooned Mtama.

(h) *Locusts*.—Scattered swarms appeared in February in South Kavirondo, hoppers later appeared and were dealt with. On June 20th flying swarms again entered a part of South Kavirondo and caused 5 per cent damage to crops in their tracks.

(i) *Cotton pests*.—Stainer, lygus and green fly did much damage, the former chiefly in Central Kavirondo and South Kavirondo. Boll worm has not yet been found.

(j) *Vermin*.—North and Central Kavirondo Local Native Councils provided funds for poisoners to control the usual pests. In South Kavirondo elephant caused considerable crop damage

and carried tsetse fly into the dairying areas. The District Commissioner organized a big drive which greatly reduced their numbers in stricken areas.

4.—LOCAL NATIVE COUNCIL SEED FARMS.

FARM	Total Area Cleared, 1934	Area under Crop	Planted with Trees	Total Ploughed End of Year
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
Kakamega ..	67½	40	1½	40
Maseno ..	60	40	5	60
Kisii ..	75	23½	8	46½

Progress was very favourable in Kakamega due largely to favourable climate and soil. Maseno suffers from soil lacking in organic matter. Ten acres have now been composted and yielded good crops, but the remainder may be considered quite unproductive. Kisii suffers from poor soil and gales, both of which will be overcome in the next few years.

Kakamega Farm.—

CROP	Area	Total Yield
	<i>Acres</i>	
Maize	26	446 bags
Mtama (Kano)	3	23 bags
Wimbi (Bukura)	6	26½ bags
Potatoes	2	150 cwts.
SHORT RAINS		
Maize	5	Not yet harvested
Groundnuts	2	Not yet harvested.
Potatoes	3	Not yet harvested.
Beans	8	A poor crop.
Ratoon "Kano" Mtama..	3	25 bags

Soil control work was done where necessary.

Buildings: Two maize cribs, each 2,000 cubic feet; One open grain-cleaning shed, 21 ft. x 14 ft.

Twenty-one permanent labourers used with one instructor; a good ox paddock encircled by an all-iron fence; the tree and plant nursery remade and a force water pump installed, etc.

Maseno Farm.—Lime does not appear to help the soil from observations on limed and unlimed fields.

Green manure has been grown on all fields but growth is generally poor and the results gained to date are rather disappointing. The best results are obtained from groundnuts, Mauritius beans and cow peas.

A new force pump was fixed over a well and water taken to a raised tank from which piping and taps supply the terraced beds.

A swamp was cleared and part of it converted to rice paddy fields, and the remainder put under plots for preliminary bulking of new crops.

Kisii Farm.—One five-acre field was contour-ridged with encouraging results as judged by the test of several heavy showers.

Eight paddocks for oxen were made and surrounded with Mauritius thorn, each being two acres.

Buildings : One maize crib and two instructors' houses.

Cropping.—The following crops were planted and harvested from a total of 29.94 acres in the long rains : Muratha maize, flat white maize, wheat varieties, linseed, sunflower, peas, beans, green manure and trees.

Short rains crops were planted in 6.96 acres and were as follows : Crotalarias and other green manures, peas and Kerr's pink potatoes.

Yields were all low due to hail storms, drought, and exposure to wind.

5.—BUKURA AGRICULTURAL DEPARTMENT FARM.

TOTAL AREA—318.71 ACRES

TOTAL AREA CLEARED TO END OF 1934	Area under Crop	Planted with Trees	Total under Plough at End of Year
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
160 acres (This includes 50 acres of permanent grazing and the small- holding)	66.87	25	77.87

(a) *General Description* from report of Agricultural Officer :—

CROP	Area	Total Yield
	<i>Acres</i>	<i>Bags</i>
LONG RAINS		
Maize	50	540
Sorghums	1½	6
Wimbi	3	10
English Potatoes (Kerr's Pink) ..	2/5	9
Green Manure	7	
Interplanted Green Manure ..	11½	
SHORT RAINS		
*Maize	5	17
Peas	1/16	
*Canadian Wonder Beans ..	5	5
*Pinto Beans	2	1½
Groundnuts	2½	Not harvested.
*Soya Beans	1	Failure.
Green Manures	4½	
Interplanted Green Manures ..	11½	
Weed Fallow	27	

*Failures

In addition to this produce, seed of various trial plants has been harvested from bulking plots.

The fields, system of rotation.—During the year the Bukura fields were grouped into outer fields and inner fields, each group being treated as self-contained for purposes of crop rotation, soil improvement and products.

The main purposes of the farm proper (apart from the sections devoted to plant trials, demonstration plots, nurseries, etc.) being the production of :—

- Maize for the food of the native staff.
- Maize, millets, beans and other seeds for bulking and issue.
- The improvement of soil fertility by a method not remote from those possible for natives.
- The outer group of fields for the production of maize and, when required, leguminous seeds as a secondary crop.
- The inner group of fields for the production of millets and other seeds on a smaller scale.

A distinct rotation is now in use for each group. For the outer maize group the rotation is :—

1st Year ..	Long	Rains	Maize.
" ..	Short	"	Weed Fallow.
2nd Year ..	Long	"	Maize.
" ..	Short	"	(Legumes if required.)
3rd Year ..	Long	"	Maize.
" ..	Short	"	Black Mauritius Beans (interplanted Long Rains).
4th Year ..	Long	"	Maize.
" ..	Short	"	Plant to Pasture Grass and Napier Grass for Four Years.

There are now five fields in the rotation, each of ten acres (the fifth was cleared and broken by the end of the year).

The plan is not in full swing yet, but during the last short rains, two blocks were under controlled weed fallow, one was under short rains legumes for seed bulking and one is being put down to grass (half immediately; half after Black Mauritius beans have been ploughed in).

The inner group of fields is divided into two rotation blocks. One has been run on a "food and cash crops" plan and the other is to be used in 1935 for a soil fertility experiment and a mixed versus single planting experiment. These fields serve as a small scale husbandry demonstration.

The rotation is :—

YEAR		Long Rains	Short Rains
1st	..	Maize ..	Green Manure.
2nd	..	Wimbi ..	Cash Crops.
3rd	..	M'tama ..	Green Manure.
4th	..	Maize ..	Pulses.

This cropping system can be modified within certain limits and according to requirements.

Compost and dung have been used entirely in the trial plots and nursery and not in the fields . . . "

(b) *Soil control on farm.*—Several expedients have been resorted to in past years and additional work again carried out during 1934. Contour ditches with bunds held with edible canna were replaced with lemon grass. Maize crops were interplanted with Mauritius bean, *Crotalaria* spp. and Njahi bean; drains were widened in places with falls in them, wash stops of *Coreopsis* spp. and *Alternanthera* spp. and sweet potatoes.

(c) *Pasture and cattle.*—More bush was cleared and subsequently weeded regularly. All the grass pasture was weeded and harrowed with good results. The oxen kept fit.

(d) *Poultry*.—These were kept for instructional purposes and pupils given regular periods on the work. To prevent fowl typhoid and other diseases the young birds were inoculated and kept in movable pens. All permanent pens were dug, limed, cleared and rested in rotation and a balanced ration given with dry hopper system. Issues given elsewhere.

(e) *Demonstrations* :—

- (1) *Sand heap* for teaching soil control methods.
- (2) *Cotton*—a plot prepared and tended by pupils.
- (3) *Tobacco nursery*—field treatment and curing.
- (4) *Composting*—preparation and application.
- (5) *Paddy and Upland Rice*—growing methods.

(f) *Nursery*.—This was used for production of forest and fruit trees, etc. The Local Native Council of North Kavirondo provided four nurserymen for timber tree transplant production. This action is looked upon as a very useful side to the training of the apprentices, who help in the work.

(g) *Buildings*.—A new maize crib was built, bringing the total storage capacity up to 7,900 cubic feet.

Three apprentice huts were re-roofed with corrugated iron, and general repairs and improvements carried out wherever possible.

6.—SEED ISSUES.

SEED ISSUES FROM DEPARTMENT OF AGRICULTURE FUNDS AND BUKURA AGRICULTURAL FARM

CROP	Measure	North Kavi- rondo	Central Kavi- rondo	South Kavi- rondo	South Lumb- wa	Outside Pro- vince	Totals
Maize	Bags	*382	—	—	—	—	382
Groundnuts	"	26	42	—	—	—	68
Tobacco, W.D.N. .. .	lb.	*25	8	—	—	—	33
Tree Seed, Other .. .	"	*105	867	—	—	—	972
Fruit Trees	Plants	*4,339	—	—	—	—	4,339
Lemon Grass (Roots)..	Bags	*18	—	—	—	—	18
Sweet Potatoes (Vines)	lb.	—	—	—	—	*800	800
Cassava Cuttings .. .	"	—	—	—	—	*500	500
Cockerels	—	*67	—	—	—	—	67
Pullets	—	*45	—	—	—	—	45
R.I.R. Eggs	—	*589	—	—	—	—	589
Sorghum Varieties .. .	lb.	—	64	—	—	—	64
Rice	"	—	84	4	—	—	88
Kapok	"	—	18	—	—	—	18
Beans, R. C.	Bags	—	$\frac{1}{2}$	24	—	—	24 $\frac{1}{2}$
Wheat	"	—	—	4	—	—	4

*From Bukura Farm

SEED AND PLANT ISSUES FROM LOCAL NATIVE COUNCIL SEED FARMS

CROP	Measure	Kakamega	Maseno	Kisii	Kap-sabet	Totals
Maize	Bags	541	5	10	49	605
Groundnuts	"	20	—	—	—	20
Wimbi " Bukura " ..	"	27½	—	—	—	27½
Potatoes	"	109	8	7	—	124
C.W. Beans	"	16	—	—	16	32
Peas	"	3½	—	—	9	12½
Butter Beans.. ..	"	1	—	—	8	9
Mtama " Kano " ..	"	—	1	—	—	1
Tree Transplants ..	Bukura Plants	{ 95,965 211,159	181,361	150,000	—	638,485
Eucalyptus Seed ..	lb.					
		30	—	—	30	60
Tree Seed—Other Varieties	"	300	—	—	300	600
Fruit Trees	Trees	—	1,122	—	—	1,122

The above figures do not embrace the tree transplants issued from the location and other nurseries, nor those trees used for planting in the bomas and seed farms.

SEED ISSUES FROM LOCAL NATIVE COUNCIL FUNDS

CROPS	Measure	North Kavi- rondo	Central Kavi- rondo	South Kavi- rondo	South Lumb- wa	Nandi	Totals
Maize	Bags	—	—	—	40	—	40
Rice	"	12	—	—	—	—	12
Black Wattle Seed	lb.	161	—	—	—	—	161
Tree Seeds, Other	"	229	—	—	—	—	229
Vegetable Seeds ..	"	56	25	25	4	12	122
Potatoes, Kerr's Pink Varieties	Bags	—	—	—	60	—	60
Groundnuts	"	—	199	—	—	—	199
Onion Seed	lb.	—	11	—	—	—	11
Beans, R.C. and C.W.	Bags	—	—	12	28	9	49
Peas, Field	"	—	—	5	—	—	5
Beans, White Runner	"	—	—	—	—	5	5
Cotton Seed Supplied by Ginners	Tons	329	176½	50	—	—	455½

7.—IMPROVEMENT IN QUALITY OF PRODUCE.

The outstanding advance was made in maize, beans, simsim, choroko, groundnuts, and finger millet.

"K.2" maize can usually be got at Kimilili, Butere, Yala, Luanda, Lela, and Maragoli.

The greatest improvement in other grains was attained in South Kavirondo.

8.—MARKETING.

The Rules under the Crop Production and Live Stock Ordinance (1926) were augmented during October 1934, and the various crops are embraced in the same rules which amongst other items demand buyers to—

- (a) mark with a registered mark all containers of produce exported from the district;
- (b) display outside shops, etc., a board bearing the price offered for produce; and
- (c) cease buying produce between the hours of 6 p.m. and 6 a.m.

With these Rules in force it is now possible to keep a greater check on traders who buy inferior quality and who attempt to export it from the districts in a similar condition.

Most of the buyers continue to use the cleaning machines for maize and simsim as in the previous year.

South Kavirondo adopted central inspection at eight trading centres, using an average of ten inspectors. Maize, beans, groundnuts, simsim, wimbi, had to be passed.

Maize prices early in the year were at Sh. 10 per bag of 200 lb., dropping to Sh. 8 at the beginning of March, holding at Sh. 9 to Sh. 10 till the end of June, when it dropped gradually to Sh. 5/50 at the beginning of August and remained below that price till the end of the year when the market was very weak. During August the traders became extremely anxious, and keen internal competition kept our prices lower than there was any need for.

Simsim.—Quantity lower than 1933 but quality never so good and prices steady between Sh. 2/25 to Sh. 2/80 per frasila.

Groundnuts.—Asembo went out of production and very little was grown in the district. South Kavirondo lost ground on account of the increase in cotton, but quality was extra fine. Prices remained steady at Sh. 2/30 to Sh. 2/50 per frasila.

Pulses.—Choroko crop was good and sold at Sh. 3/50 to Sh. 4/50 till the harvest in December brought the price to Sh. 2/50 per frasila.

Beans.—Quality greatly improved and prices kept good at Sh. 9 to Sh. 11 per bag of 200 lb.

9.—INCREASED PRODUCTION OR OTHERWISE.

Cotton	..	..	Increase.
Maize	..	..	Increase.
Pulses	..	..	Increase.
Simsim	..	..	Increase in South Kavirondo, decrease in North and Central Kavirondo.
Groundnuts	..	..	Decrease.
Roots	..	..	Increase.
Wimbi	..	..	Increase—Kisii Trading Centre alone exported 25,000 bags.

10.—SOIL FERTILITY AND EROSION.

The need for maintaining soil fertility and the prevention of soil erosion was continually stressed by all Agricultural Officers in all districts.

Special demonstrations were given in Maragoli and in parts of Central Kavirondo. In the main cotton region nearly all cotton was planted in lines on the contour and rows of weeds kept between the lines. Rows of built stones are being made by many natives in the hilly places where stones are present, but up to date, few natives have planted live bunds to hold the wash. The need is gaining popularity and natives are more easily induced to try the new idea.

11.—NATIVE AGRICULTURAL TRAINING.

The system is as in past years for the training of instructors. They get a three years' course at the Bukura School. This is supplemented with a refresher course of two weeks' for instructors who had spent several years in the reserves. The aim is to get picked natives from the reserves to enter the seed farms for six months' practical work so that they may return to their homes and adopt better methods there.

The Agricultural Officer, Bukura, describes the work as follows:—

"Agricultural training has been provided on the Bukura farm, in the school and in the local reserve, for African apprentices of the Kavirondo Bantu, Luo, Suk, Kamasia, Marakwet, Elgeyo, Nandi and Lumbwa tribes.

Recruitment.—During January, seventeen apprentices were engaged on probation, bringing the total number in residence to fifty-six. The districts of probationers were:—

South Kavirondo (Luo)	...	...	3
South Kavirondo (Bantu)	...	...	2
Central Kavirondo (Luo)	...	...	3
North Kavirondo (Bantu)	...	...	6
Nandi	...	...	1
Elgeyo	...	...	1
Kamasia	...	...	1

One South Kavirondo Luo and one South Kavirondo Bantu were discharged as unsatisfactory and two natives of the West Suk tribe, from the Government African School, Kapenguria, were engaged on probation during February, in the places of the two discharged.

All others and these two Suk were indentured after their period of probation.

Tribal Analysis for the Year.—The tribal analysis for all apprentices in training during the year was as follows :—

TRIBE	Left Dec., 1934 In 3rd Year	Leaving Dec., 1935 No. in 2nd Year	Leaving Dec., 1936 No. in 1st Year	Total
N. Kavirondo Bantu	4	6	6	16
C. Kavirondo Luo ..	8	4	3	15
C. Kavirondo Bantu ..	—	2	—	2
S. Kavirondo Bantu ..	—	6	1	7
S. Kavirondo Luo ..	—	—	2	2
Suk	—	—	2	2
Kamasia	—	2	1	3
Elgeyo	—	1	1	2
Marakwet	—	1	—	1
Nandi	—	3	1	4
Lumbwa	—	2	—	2
TOTAL ..	12	27	17	56
Agricultural	12	18	12	42
Pastoral	Nil	9	5	14

The comparatively large number leaving in 1935 is accounted for by apprentices of South Kavirondo and pastoral tribes, in whose districts there should be plenty of scope for employment, as trained instructors of these tribes are only now beginning to become available, to meet the demands of agricultural development.

Employment of 1934 apprentices.—One North Kavirondo Bantu apprentice was discharged at the end of May and received employment as an instructor in North Kavirondo. Eleven apprentices, three N.K. Bantu and eight C.K. Luo, were discharged at the end of December. Three have already been engaged as agricultural instructors, one at the Government African School, Kisii, one in North Kavirondo and one at the Kabete Reformatory. One is working his own land for a period of six months or more. Of the other seven, no information is as yet available.

Regulation of the future supply of trained men.—By the end of 1935, trained apprentices will be available of all tribes except Suk and S.K. Luo. From 1935 onwards, much care will have to be given to the number of men engaged from each district served by this school.

There is no immediate likelihood of the supply exceeding the demand in the case of other tribes, trained men of which are only just becoming available. Regulation of supply will become more necessary in the case of these tribes later.

Employment of Apprentices discharged prior to 1934.—Of apprentices discharged in December 1933, all except one received agricultural employment, in most cases of a permanent nature, in other cases temporary. A Bantu instructor was supplied for the West Suk district. One instructor returned from the Jeanes course and has been employed at Bukura. It has been possible to re-employ several old Bukura apprentices during the year.

Refresher Course for Instructors.—In September, a refresher course for instructors (the first of its kind) was held. It was attended by six instructors, two from N.K., two from C.K. and two from S.K. Six teachers in training from the Maseno Central School (C.M.S.) also attended, together with a European teacher from that school. The duration of the course was a fortnight. Instructors received lectures and were given demonstrations and did practical work under the following headings:—

A.—Husbandry.

B.—Seed selection and crop notes.

C.—The work of the agricultural instructor.

Each member of the course was provided with a set of notes covering the work done, for permanent reference.

This course will be an annual feature of the training work in future years, it is hoped. Instructors should benefit by periodic revision and instruction to bring their knowledge up to date.

System of training.—Training is based on imparting a thorough practical knowledge of all forms of agricultural work and activities. A complete course of lectures on agriculture, agricultural practice, simple agricultural science and related subjects is interrelated with the practical side of the training. (Of fifty hours per week, approximately thirty-five are devoted to practical and fifteen to theoretical work.)

Standard of education.—There is a definite improvement and more educated natives are taking a genuine and practical interest in agriculture. There is every indication that the new recruitment scheme, to be introduced in 1935, in conjunction with the new terms of service for instructors, will be, in the near future, a success and will improve both the standard of work and of personnel.

Apprentices' practical work.—All forms of routine farm work; soil erosion control; nursery practice; animal husbandry; poultry; irrigation work and cultivation; care of various crops in the field; curing of tobacco; harvesting of cotton; composting; seed selection; field mensuration, etc.; have been included. An effort has been made to teach good methods of reporting. All apprentices are required to have by them a reliable measuring stick, and are urged to buy a good knife. Each apprentice has been personally responsible for the work in his own garden in his spare time. The standard of work in these school gardens has been definitely improved. Apprentices are encouraged to try the kinds of crop grown at their own homes. Regular criticism and marking has been given individually and awards are to be made. Each house has also a dry weather vegetable garden, looked after by all apprentices living in the house under the supervision of the house prefect.

Apprentices' school work.—The regular course of lectures in agriculture and related subjects has been interspersed with tests. Leaving and entrance examinations have been set. Such subjects as economics, accounts, homestead planning, etc., are now included in the regular course.

Until all apprentices are boys who have passed the Primary School Examination, some extra teaching is desirable to enable apprentices who have not already done so to pass this examination while still at Bukura. This is all the more necessary now that the standard of education required at the time of indenture has been raised.

The results in this direction for 1935 are as follows :—

Elementary School Examination, November 1934—

Entrants : 14. Passed : 9.

Primary School Examination, November 1934—

Entrants : 13. Passed : 4.

There is no doubt that the educated native, if he has a definite agricultural leaning, makes the best instructor.

12.—MAIN PROBLEMS IN HAND FOR NEXT YEAR.

A scheme of work for 1935 has been planned for all areas so that there will be no doubt in the minds of any officers who are helping, nor will the natives themselves be at a loss to know the Government aim.

A few of the more important points are detailed under :—

- (a) Cotton extension work to take place in all Kavirondo districts and a new ginnery opened at Kibos.
- (b) Groundnut planting to be extended in all suitable areas.
- (c) Wattle in Serem area of Nandi, North and Central Kavirondo, Belgut and Buret of Lumbwa district and Kisii highlands in South Kavirondo.
- (d) Coffee planting in South Kavirondo.
- (e) Tree planting with bigger nurseries in all Kavirondo Districts, especially in gold-mining areas.
- (f) Mtama : early varieties "Dobbs" and "Kano" to be issued and bulked further.
- (g) Muratha maize to be bulked at all seed farms and issues made in February.
- (h) Soil control advice and demonstration in all parts. Special concentration in South Maragoli.
- (i) Beans to be changed from Canadian Wonder to Rose Coco.
- (j) Marketing.—Central inspection to be extended from South Kavirondo to North and Central Kavirondo.
- (k) Beeswax industry to be fostered, especially in South Lumbwa.
- (l) Tobacco cultivation to be extended in Marama.
- (m) Vegetable growing to be fostered and natives to pay for all seed samples issued.
- (n) Seed farms.—Improve and add to the buildings, ox paddocks, etc.
- (o) Rice growing in North and Central Kavirondo, etc.

13.—GENERAL.

(a) *Ploughs*.—Towards the end of the year there was a rapid revival in purchase of ploughs. Many foreign makes are on the market.

One District Commissioner in advising an old native woman to get her husband to buy a plough and save her the heavy digging work replied that he had two, but she had still to dig so that she may profitably occupy her time.

The Nandi Local Native Council again voted Sh. 1,000 for presentation ploughs to be given to those natives who produce trained teams of oxen complete with yokes and chains.

(b) Grass burning was again prevalent in North and South Kavirondo, Nandi and Lumbwa. Opinion is slow to change against it.

(c) Motor lorry transport is still too common in places where there is no need for it. This is particularly the case on the Butere, Yala, Luanda and Kisumu region. Daily light trains are advised.

Donkey transport has advanced. It was increased in Lumbwa and introduced in a large scale in part of Central Kavirondo.

(d) Agricultural show exhibits were taken to Nakuru. Marketing and quality of produce were chiefly demonstrated.

(e) Gold mining has given a great impetus to tree growing, maize, fruit, vegetable, gardening and poultry farming.

(f) Grass reclamation in Nandi—935 acres completed, at a cost of Sh. 8 per acre.

(g) Essential oils. Certain varieties were tried at Bukura, and lemon grass is being bulked at all farms with the view of issuing roots should the price of oil improve.

14.—APPRECIATION.

It is desired to record the appreciation of the Provincial and District Agricultural Officers concerning the great assistance rendered to them by the Administration and other departments during the year under review.

W. LYNE WATT,

*Agricultural Officer,
Nyanza Province.*

REPORT OF THE AGRICULTURAL OFFICER IN CHARGE COAST PROVINCE

STAFF.

Mr. C. O. Oates, Agricultural Officer, was in charge from the 1st January to 9th June, when he proceeded on leave.

Mr. N. Humphrey, Agricultural Officer, was in charge from 1st October to 31st December and was stationed at Kibarani.

Mr. J. T. Moon, Agricultural Officer, arrived on first appointment 18th February, and was stationed at Kibarani.

Mr. G. R. Nightingale, Temporary Assistant Agricultural Officer was appointed mid-September and was stationed in Digo in connection with the harvesting and marketing of the cotton crop.

Mr. Wasti Ram Sethi, Agricultural Assistant, was appointed on 1st April and was stationed at Kau, Tana River District.

Native Staff.

An increase in the number of instructors took place during the year mainly in Digo district. At the end of the year the distribution was as follows :—

Kibarani	...	...	4
Kilifi District	...	...	17
Malindi Sub.-Dist.	...	...	10
Digo District	...	...	13
Tana River District	...	...	2
Voi	...	...	1
Garissa	...	...	1

Owing to the backward nature of the Coast tribes and the lack of training facilities, the standard of efficiency is low. Most of these instructors are paid by the Department but in Kilifi eight and in Digo three are paid by the Local Native Councils.

WEATHER.

The weather conditions throughout the year have been difficult and can be summed up in brief as two droughts and one flood. Starting with conditions of drought, these continued until the long rains broke in April. These were the heaviest

on record in most places and continued until October. In some of the locations in the hinterland, however, the drought continued throughout the period but in a 20-mile strip from the sea the time was one of long continuous rain.

The short rains were late and a failure and by the end of the year the country was becoming extremely dry once again.

CROPS.

General.

The short rains crop of 1933 having failed following on the failure of the 1933 long rains, the beginning of 1934 found the Coast faced with a serious food shortage and famine relief became necessary. In many parts it was necessary to issue seed in order that the natives might have enough to plant. Many natives left the reserve and worked in the Coastal strip, which assisted in considerable development in that area with a diminution in the area under cultivation in the reserve.

Cereals.

Maize continues to be the chief cereal and on the whole good crops were obtained in the long rains, though the season was difficult. Late plantings have been moderately successful but short rain plantings will be largely a failure owing to the resumption of dry conditions.

More interest is being shown in the millets and sorghums produced by the Department, some of which are extremely suitable for the peculiar conditions found on the Coast, with its erratic rainfall. With the assistance of the Administration, the use of these in substitution for risky crops is spreading.

In certain parts rice showed a considerable increase due to the wet season, natives being awake to the value of rice in a year as favourable as 1934.

Legumes.

Bean crops have been under average owing to the excessive length of the long rain season. Cowpeas especially suffer in such circumstances and yields were generally low.

Coco-nuts.

With the market for copra as low as it is at present, the picture is not very bright; a large trade, however, is done in whole nuts in Mombasa and as a source of "tembo" the coco-nut palm continues to hold pride of place.

Sugar.

This industry has found it a year of great difficulty with abnormal climate conditions and infestations of locusts. The end of the year found the canes once again beginning to suffer from drought owing to the failure of the short rains.

A bright spot in the position has been the evidence that natives near Ramisi are beginning to appreciate the value of sugar cane as a crop. Each year shows an increase in the number of native growers, who sold their cane to the local factory, and though this number is very small there is evidence that it will continue to increase to the benefit of the area concerned.

Cotton.

1933-34.—The final figures for this season showed a large increase again and saw two ginneries working on the Coast, apart from the small private one at Taveta. The lint return was 423,631 lb. In 1930-31 it was 17,303 lb.

1934-35.—In the present season a further step forward was planned and in addition to increased planting in the other areas a campaign to introduce the crop amongst the Wadigo was carried out. Unfortunately, for various reasons the season has not been as successful as was hoped. Excessive rain ruined many of the earlier plantings and greatly reduced the quality of the crop. In the Nyika Reserve the famine was a severe obstacle. The natives had little heart for looking after more than their food crops and as already noted, many went to the Coast strip, where a large increase in acreage under cotton was the result. It is anticipated that the whole season will show an increase over the previous year though by no means what might have been expected under more favourable conditions.

A redeeming feature was the higher price, which was 12 cents for first grade and 7 cents for second grade at the ginneries, with the majority of buying posts 1 cent less. This is the best price since the beginning of the depression and it may be hoped that it will more than effect the disappointing season.

Cashew Nuts.

Planting has continued during the present year around Kilifi, whilst increasing interest is reported from Malindi. At the end of the year the new season had been opened with buying in progress in Malindi, Kilifi, Mombasa and Digo.

On the marketing side considerable experience has been gained and it may be hoped that before long the industry will grow from the stage of infancy into thriving youth. There are large areas of the WaNyika Reserve suitable for this crop and there are increasing signs that the Giriama are taking slowly to its cultivation.

Seed Bulking.

The Local Native Councils of Kilifi and Digo Districts contributed towards the cost of the work at Kibarani, their contributions being devoted to the bulking of proved crops for issue.

Pests and Diseases.

Mr. C. A. Thorold, Mycologist, spent a few days on the Coast on return from leave and before proceeding up-country. The visit was mainly in connection with the cotton crop, which had suffered from the adverse season, but opportunity was taken to report on a number of other important crops.

Mealy bug caused considerable loss in some of the cane fields of Ramisi, where locusts also were a serious menace throughout the year.

The damage done by stainers to cotton was higher than usual owing presumably to the unfavourable season.

No other pests were serious during the year.

COAST ADVISORY COMMITTEE.

Two meetings of this Committee were held during the year in May and August.

COMMUNICATIONS.

For a large part of the year communications were very bad owing to the excessive and continual rain. The need for all weather trunk roads is increasingly urgent as each year the traffic they are called upon to carry shows an increase.

GENERAL PROGRESS AND DEVELOPMENT.

As already noted, cotton was introduced into Digo district and a small quantity was issued in the Tana River district, thus the crop has now been introduced or reintroduced into all the maritime districts. The main area continues to be the Kilifi and Malindi Coast Strip and everywhere else a great deal still remains to be done if the work is to be consolidated and the crop properly established.

Of the greatest importance has been the establishment of the Coast Experiment Station at Kibarani on a firmer basis than hitherto. The year has seen a lease of three hundred acres taken out and the construction of a permanent seed store. With this accomplished, it was possible in the latter part of the year to draw up plans for the development and laying-out of the station. Funds are very limited and it is necessary to do development work out of current expenditure, so that the difficulties of the past are by no means over. Equipment is very scanty and can only be increased slowly. Various problems also have to be solved before the station can be organized properly and the solutions also entail the expenditure of money for their application. As time passes, however, the station will be increasingly able to carry out the work that is waiting to be done on the Coast.

At the same time the increase in staff makes it easier to cope with the work of the station and the extension work without one or other suffering in the process. The development of the station itself will facilitate the production of better trained instructors than has been possible in the past.

Tana River District.

A survey by Messrs. Sampson and Harris was undertaken under Colonial Office auspices, of the possibilities of developing the Tana River area by means of irrigation, and their report was issued during the year.

Rice trials have been started at Kau and are being continued. Seed of other cereals was also issued and some cotton planting carried out.

Teita District.

It has not been possible yet to station an officer in this district, which consequently only received occasional visits during the year. In October a report was submitted on alternative areas suggested for the settlement of the WaKasigau following on the Land Commission Report.

Towards the end of the year discussions were taking place on the possibility of introducing cotton into the Taveta Reserve.

In conclusion thanks are tendered to Administrative Officers for their co-operation in agricultural matters.

NORMAN HUMPHREY,
*Agricultural Officer,
Coast.*

Part III.—Animal Industry

REPORT OF THE DEPUTY DIRECTOR (Animal Industry) AND CHIEF VETERINARY OFFICER

The services of the Division of Animal Industry are concerned with all aspects of that industry throughout the Colony and this report, as compared with former reports, is very considerably curtailed for reasons of economy, thus only the main features in respect of development, disease incidence and control, Research and Investigational work, are presented herewith.

In spite of the many difficulties experienced during the year, definite progress can be reported in general development. The chief indication of extended progress is found in the more confident spirit in which stock owners have faced these difficulties and overcome them in a spirit of determination. As a consequence there is an advancement in stock farming in European areas, and a marked tendency in the direction of mixed farming in the more fertile areas of the Colony, also in the system of farming which is being fostered in the more advanced native reserves.

Other influences, of a material kind, have assisted this extension of development such as the prospect of better marketing facilities, a better understanding of the economic aspects of stock farming, the recognition of the necessity for the provision and storing of supplementary food supplies and the provision of suitable fertilizer for the soil.

Extensive enquiries have been made during the year into the possibility of organizing the marketing of dairy products by means of legislative assistance, and also, into the question of promoting overseas markets for the export of meat and meat products.

The prospect of marketing the ghee from native sources has been further investigated in India and the prospect of a market for surplus supplies when standard quality and definite supplies are available for export.

The internal marketing of stock and stock products has been maintained by private enterprise. The export of butter has had some assistance through the Butter Levy Ordinance.

Although the meat consumption at the larger centres of population, such as Nairobi and Mombasa, has remained steady, the general consumption of meat in native reserves, particularly the Nyanza Province, has made appreciable strides.

Through the termination of the services of an Animal Husbandry Officer, during the year, the department has been deprived of expert advice on many important matters concerning the development of stock breeding and production.

The Director's report covers many points in the various activities of the Animal Industry Division in relation to production and export.

BRANDS.

The number of Stock brands supplied were as follows :—

European—

"S" Brands	...	...	...	24
Renewal Brands	...	...	...	9
Brands Registered	...	...	...	57
Brands Transferred	...	...	...	3

Native—

Brands Registered	...	...	...	5
Brands Cancelled	...	...	...	1

PERMIT SYSTEM.

During the year the following changes took place in the personnel of honorary permit issuers :—

Remaining 31st December, 1933	...	134
Remaining 31st December, 1934	...	136
New appointments	...	15
Resignations	...	11
Deceased	...	2

The opportunity is taken to record appreciation for the valuable assistance rendered by these gentlemen, not alone to the department, but also to the stock industry in general.

ANIMAL DISEASE.

1—SETTLED AREAS.

STAFF.

The distribution of Veterinary Stations throughout the settled areas, during the year, was as follows :—

					Veterinary Officer	Stock Inspector
IN CHARGE OF :						
Nairobi	..	..	..	..	—	1
Nakuru	..	..	..	..	1	—
Naivasha	..	..	..	..	—	1
Eldoret	..	..	..	..	1	—
Kitale	..	..	..	..	—	1
Lumbwa	..	..	..	..	1	—
Kericho	..	..	..	..	—	1
Nanyuki	..	..	..	..	1	—
Thomson's Falls	..	..	..	..	—	1
TOTAL					4	5

Stock Inspector's stations are in the nature of subsidiary stations and are supervised generally by the Veterinary Officer of the area concerned who is also usually required to render veterinary services in neighbouring native reserves.

The rinderpest service unit in charge of an experienced Stock Inspector and staff of native inoculators, served throughout the year in the settled areas, and native reserves, as necessity arose. The figures for rinderpest immunisation carried out by the unit, are included in the figures for the total rinderpest immunisation in the Colony.

DISEASE—GENERAL.

The disease position in the Colony during the year was far from satisfactory as a study of the disease statistics herein presented will show. This unfortunate position is due to a variety of circumstances all of which are directly or indirectly concerned with the difficult times through which the Colony is now passing.

It is the desire of this Division to render every possible service of stock owners, but the staff available necessitates that each officer has an exceedingly large area to supervise and consequently only the most urgent work can usually receive attention, and this frequently when it is too late to prevent serious mortality. Again, the application of disease control measures must of necessity involve expense and with the present restricted markets, low price levels, and in many districts the prevalence of drought conditions, the stock owner cannot be blamed if he defers the incurring of expenditure until the alternative becomes only too obvious.

The disease position, however, must be overcome if the developmental position already attained, is to be maintained and expansion assured. This can only be achieved by a full realization of the implications: constant supervision, early diagnosis, application of preventative measures and the fencing of holdings. The odd case of mortality too often remains uninvestigated and it is thus that disease has every chance to become established.

The presence of squatter stock on stock farms is a constant menace in regard to disease distribution, but many districts having realized this important fact, have by general agreement eliminated squatter-owned cattle, and other districts, it is understood, contemplate similar action.

SUMMARY OF OUTBREAKS OF DISEASE IN SETTLED AREAS
DURING THE PAST FIVE YEARS.

DISEASE	1930	1931	1932	1933	1934
Rinderpest	34	29	61	35	68
East Coast Fever	33	33	76	109	83
Pleuro-pneumonia	3	1	1	3	4
Blackquarter	93	104	54	56	58
Trypanosomiasis	12	10	8	12	3
Foot and Mouth Disease ..	44	20	21	20	26
Horse Sickness	20	19	11	12	14
Ulcerative Lymphangitis ..	8	3	9	5	15
Epizootic Lymphangitis ..	3	—	6	—	—
Contagious Bovine Abortion ..	8	29	16	13	19
Swine Fever	3	4	1	—	4
Anthrax	23	25	25	41	29
Rabies	—	1	23	22	11

Quarantines.

The following particulars are furnished in respect of quarantines imposed and revoked during the year, in Settled Areas and Native Reserves, showing comparison with 1933.

DISEASE	Imposed		Revoked		Remaining	
	1933	1934	1933	1934	1933	1934
East Coast Fever :						
Northern " Clean " Area	53	42	28	27	94	112
Molo " Clean " Area ..	6	12	10	3	9	18
Limuru " Clean " Area	—	1	2	—	1	3
Rinderpest	45	72	41	63	21	22
Trypanosomiasis	10	1	3	12	21	12
Rabies	4	15	2	14	9	8
Pleuro-pneumonia	6	8	10	5	10	12

Rinderpest.

The number of outbreaks of rinderpest reported in the settled areas has increased by nearly 100 per cent over the number reported last year and is higher than similar reports for the four previous years.

The widespread prevalence of the disease in game was undoubtedly an important contributory factor to the incidence of the disease amongst cattle. Many of the wild ruminants are susceptible to rinderpest, and it is a curious provision of

nature that although rinderpest is mainly a disease of ruminants, wild pig are not only susceptible, they are frequent disseminators.

Rinderpest virus remains viable in body tissues, secretions and excretions for varying periods probably short periods, depending on circumstances, and this fact is an important consideration in regard to control measures. It is for this reason that the department constantly and consistently urges the necessity for immunisation, to prevent mortality which would ordinarily occur when natural outbreaks appear amongst unprotected animals.

The department has now available, apart from serum alone, three methods by which immunisation or high resistance may be conferred.—

- (a) The simultaneous method, virus and serum, i.e. the original double inoculation method.
- (b) Vaccine alone.
- (c) Vaccine and virus.

These various methods are advised as circumstances indicate; thus the double-inoculation method is usually applied to native cattle conferring a permanent immunity; vaccine alone for purebred and grade cattle, too valuable to expose to the risk of mortality or other complications which may follow the administration of virus. The immunity or resistance is, however, of a temporary nature, but in the case of adult cattle may be as long as two years.

The vaccine virus method is still more or less in the experimental stage, as the period of immunity has not yet been determined but is expected to be of long, perhaps permanent duration. The risk of mortality from rinderpest and complications is not so great as in the case of double inoculation and if the immunity proves to be permanent or even of long duration, the method will probably come much into favour.

In discussing virus field inoculations, it is well to note that virus, as formerly administered, was virulent blood produced from virus makers set up in the field. The virus now used is spleen virus prepared, and distributed to field stations by the Veterinary Research Laboratory. This procedure has very considerably facilitated field operations, by the total elimination of protozoal or bacterial infections from the virus and by a great saving of time and organization.

SETTLED AREAS—RINDERPEST IMMUNIZATIONS

SETTLED AREAS	Double Inoculations		Serum Alone	V.B. Test	Rinder-pest Vaccinations	Vaccine and Virus
	Adults	Calves				
Kibigori	6,581	162	—	13	—	—
Uasin Gishu	19,159	1,681	—	—	—	1,327
Machakos	2,442	265	111	5	1,476	1,205
Trans Nzoia	12,539	2,054	—	—	—	—
Nairobi	2,809	489	—	—	—	—
Lumbwa	2,590	901	104	47	—	697
Laikipia	—	—	—	—	931	5,800
TOTAL	46,120	5,552	215	65	2,407	9,029
	51,672					

NATIVE RESERVES—RINDERPEST IMMUNIZATIONS

NATIVE RESERVES	Double Inoculations		Serum Alone	V.B. Test	Rinder-pest Vaccinations	Vaccine and Virus
	Adults	Calves				
Central Kavirondo .	9,329	10,864	16	—	—	—
North Kavirondo ..	1,603	2,301	90	—	—	—
Kajiado District ..	—	—	—	—	30,650	—
Machakos Reserve .	1,433	258	—	—	—	—
Lumbwa Native Reserve	1,405	1,979	446	—	—	—
Nandi	7,512	1,778	—	155	—	—
Elgeyo Marakwet ..	2,822	443	—	—	—	—
Timboroa	4,258	716	—	—	—	—
Isiolo	—	—	105	—	50	—
Coast	—	—	—	—	75	—
Samburu Native Reserve	—	—	—	—	32,425	—
TOTAL	28,362	18,339	657	155	63,200	—
	46,701					
TOTAL FOR THE COLONY						
Settled Areas	51,672		215	65	2,407	9,029
Native Reserves	46,701		657	155	63,200	—
TOTAL FOR COLONY	98,373		872	220	65,607	9,029

NOTE.—Rinderpest vaccination figures show only animals vaccinated by the staff and do not include vaccinations carried out by stockowners themselves.

East Coast Fever.

There were fewer outbreaks of East Coast fever in the non-enzootic areas during the year than the preceding year but more than recorded during any of the six years preceding 1933. The number of outbreaks reported during 1934 was 83,

as compared with 109 during 1933 and 76 during 1932. The outbreaks of this disease recorded during the last three years, have exceeded the number recorded during the previous three years by over 100 per cent.

These facts indicate that the disease is extending and also that more attention is being devoted to diagnosis. The last three years were indeed difficult years for stock owners, who, owing to drought conditions were frequently obliged to move cattle in search of grazing, and to suspend dipping and other precautions so necessary for East Coast fever protection. Outbreaks of the disease occurred as a natural consequence, the alternative was very often mortality from starvation.

This department realized some years ago that the only effective method of dealing with the disease, was the application of compulsory fencing and dipping regulations. Ordinances in these respects were prepared and passed, but could not be put into operation because of the financial implications.

Many farmers, however, have fenced their holdings and carry out regular dipping, but until these practices become general, much of their value is lost.

The following numbers of animals were tested for East Coast fever immunity and branded with the recognized Government brand, at Kibgori 470, Machakos 251, Total 721.

Contagious Bovine Pleuro-Pneumonia.

Four outbreaks of this disease occurred in the Settled Areas during the year, as compared with three during the previous year and for each of the two years preceding 1933. The disease is not difficult to suppress on farms where control measures can be applied. Slaughter of clinically affected animals and vaccination of in-contacts, are usually effective in a comparatively short period. In native reserves, on the other hand, where slaughter is not usually accepted, the disease may persist for indefinite periods.

The following numbers of cattle were vaccinated for Contagious Bovine Pleuro-Pneumonia during the year in settled areas 1,901, in native reserves 80,335, Total 82,236.

Blackquarter.

The number of outbreaks recorded, 58, shows a slight increase over the numbers for the two preceding years. The disease is widespread throughout the Colony, but it is only occasionally and in certain areas that mortality is serious. Vaccination should be carried out regularly where the disease is established.

Trypanosomiasis.

This disease was somewhat dormant during the year in the settled areas; only three fresh outbreaks were recorded. It may be that the conditions of drought were not favourable and suitable for anything like extensive invasions of Tsetse fly. The Entomologist visited various farms more particularly in connection with previous invasions. The settled areas are generally singularly free from Tsetse fly, but a few areas have been invaded and are threatened by invasion from neighbouring native reserves.

Foot and Mouth Disease.

Twenty-six outbreaks are recorded, but in most instances the disease was not particularly virulent. Some twenty outbreaks were recorded the previous year and twenty and twenty-one for the years 1931 and 1932 respectively. The peak year was in 1930 when 44 outbreaks were recorded and the disease was particularly virulent on certain farms. Veterinary sanitary measures constitute the only form of control applied in the Colony.

Ulcerative and Epizootic Lymphangitis.

There were fifteen outbreaks of Ulcerative Lymphangitis, the less serious of the two diseases, and no cases of Epizootic Lymphangitis.

Contagious Bovine Abortion.

The number of recorded outbreaks of this disease, nineteen, does not represent a true picture of the extent of the infection. A comprehensive survey of the disease has not been made, but it is believed to be widespread and in the absence of exact data, it is not possible to state what percentage of farms are infected.

Laboratory tests are carried out at a charge of 50 cents per sample and re-tests are carried out free of charge.

Swine Fever.

This disease does not seem to make much headway in this Colony; only four outbreaks were recorded during the year and only seventeen outbreaks altogether during the seven previous years. Prophylactic treatment has not yet been applied.

Anthrax.

Only eleven outbreaks were reported as compared with twenty-two last year and twenty-three in 1932. The disease is, however, widespread but rarely causes serious mortality as

vaccination is usually carried out as a safeguard in known infected areas, or immediately the first case has been diagnosed.

Contagious Nodular Vaginitis.

A condition which is called "contagious nodular vaginitis" for want of a better name, has frequently been met with in various districts of the Colony and is often associated with some degree of sterility but on certain farms reaching a very high percentage in the breeding herds. The condition has even been observed in female calves not more than two months old and in young heifers previous to mating, so it may be inferred that coitus is not the only mode of transmission. Certain forms of antiseptic treatment appear to have at least a temporary effect in causing the lesions to disappear or subside. It is not known whether the condition is or is not contagious; this point remains to be determined. It has, however, been observed that reports of the condition and associated sterility, are infinitely more numerous in times of acute shortage of grazing, or at least green grazing, and it may be that the solution is to be found in this direction.

Rabies.

Eleven cases of rabies amongst dogs or jackals were confirmed in the settled areas this year as compared with twenty-two confirmed cases for the previous year: a decrease of 50 per cent. The total number of cases confirmed in the Colony including native reserves during the year was nineteen as compared with forty-six the previous year. In this Colony the disease, so far as observations go, has been mainly confined to dogs and jackal. Poison baiting has to some extent been effective in destroying uncontrolled dogs and jackal. Infected areas are placed in quarantine; dogs are not permitted to leave such areas unless subjected to a six-months' period of quarantine at a recognized quarantine station. Dogs may be permitted to enter these areas if accompanied by a permit signed by a verterinary authority.

The area distribution of confirmed cases of rabies is shown as follows:—

				Dogs	Jackal	Total
EUROPEAN AREAS:						
Kisumu-Londiani	..	..		—	2	2
Uasin Gishu-Eldoret	..	..		2	7	9
NATIVE RESERVES:						
North Kavirondo	..	..		3	2	5
Central Kavirondo	..	..		2	1	3

The numbers of confirmed cases in dogs and jackal :—

Dogs	..	..	..	7
Jackal	..	..	..	12
TOTAL				19

Natives bitten, 29; poison baits: total number laid, 133,854; recorded mortality, dogs 9,056; jackal 1,209; other animals 496.

Reference is again made to rabies under section II, Native Reserves.

Other Diseases.

The following diseases of animals were also observed and with the exception of tick-borne diseases and measles, were mostly of minor significance: Redwater and Anaplasmosis, Heartwater, Haemorrhagic Septicaemia, Tuberculosis coccidiosis, "Sweating Sickness", Colon Bacillosis, Bacillary Necrosis, "Turning Sickness", Paratyphoid Cowpox, Measles, Nairobi Sheep Disease, Sheep Scab, various lung diseases of sheep, Contagious Pleuro-Pneumonia of sheep and goats, Equine Biliary Fever, Canine Tick Fever, Kikuyu Fowl Disease, Fowlpox, Fowl Visceral Gout, Enteritis (Pigs), Measles (Pigs)

Outbreaks of the more important diseases as they occurred in the various veterinary districts in the settled areas are tabulated as follows :—

COMPARATIVE SUMMARY OF OUTBREAKS OF DISEASE IN THE NAIROBI DISTRICT DURING THE YEAR AND THE THREE PREVIOUS YEARS

DISEASE	1931	1932	1933	1934
Rinderpest	3	13	7	22
East Coast Fever	1	3	32	30
Epizootic Lymphangitis ..	—	6	—	—
Ulcerative Lymphangitis ..	—	4	1	11
Anthrax	3	3	5	4
Trypanosomiasis	—	4	5	2
Bovine Pleuro-pneumonia ..	—	—	1	—
Swine Fever	1	—	—	—
Horse Sickness	1	2	—	6
Blackquarter	6	3	1	—

COMPARATIVE SUMMARY OF OUTBREAKS OF DISEASE IN
THE NAKURU DISTRICT DURING THE YEAR AND THE
THREE PREVIOUS YEARS

DISEASE	1931	1932	1933	1934
Rinderpest	1	3	4	1
Pleuro-pneumonia	—	—	—	—
East Coast Fever	12	13	17	19
Trypanosomiasis	—	1	6	1
Blackquarter	17	2	12	6
Anthrax	15	8	20	6
Foot and Mouth Disease	6	4	8	4
Horse Sickness	1	1	2	3
Ulcerative Lymphangitis	1	5	—	1
Contagious Abortion	41	8	12	9
Kikuyu Fowl Disease	4	2	1	1
Swine Fever	3	1	—	1

COMPARATIVE SUMMARY OF OUTBREAKS OF DISEASE IN
THE UASIN GISHU AND TRANS NZOIA DISTRICTS DURING
THE YEAR AND THE THREE PREVIOUS YEARS

DISEASE	1931	1932	1933	1934
Rinderpest	11	24	7	5
East Coast Fever	18	26	26	11
Anthrax	7	9	9	4
Blackquarter	59	42	38	45
Trypanosomiasis	—	1	—	—
Ulcerative Lymphangitis	6	—	1	—
Foot and Mouth Disease	10	7	2	4
Horse Sickness	6	1	—	1
Kikuyu Fowl Disease	27	11	3	1
Contagious Abortion	1	—	—	2
Pleuro-pneumonia	—	1	—	—
Cowpox	—	—	2	—
Rabies	—	—	7	9

COMPARATIVE SUMMARY OF OUTBREAKS OF DISEASE IN
THE NANYUKI DISTRICT DURING THE YEAR AND THE
THREE PREVIOUS YEARS

The Nanyuki Veterinary District includes the Laikipia Administrative District.

DISEASE	1931	1932	1933	1934
Rinderpest	6	—	—	17
East Coast Fever	12	16	30	14
Pleuro-pneumonia	2	—	1	2
Foot and Mouth Disease	5	—	7	14
Trypanosomiasis	—	2	—	—
Heartwater	1	—	4	4
Blackquarter	19	1	5	5
Horse Sickness	1	6	9	2
Anthrax	—	1	5	13

COMPARATIVE SUMMARY OF OUTBREAKS OF DISEASE IN
THE LUMBWA VETERINARY DISTRICT DURING THE
YEAR AND THE THREE PREVIOUS YEARS

DISEASE	1931	1932	1933	1934
Rinderpest	5	18	12	17
East Coast Fever	3	8	4	9
Anthrax	2	2	2	2
Blackquarter	1	—	—	2
Trypanosomiasis	—	—	2	—
Ulcerative Lymphangitis ..	—	—	3	1
Foot and Mouth Disease ..	1	2	—	4
Horse Sickness	14	—	1	2
Contagious Abortion	—	—	1	2
Pleuro-pneumonia	—	—	1	2
Hæmorrhagic Septicæmia ..	—	—	1	1
Rabies	—	1	13	2

COMPARATIVE SUMMARY OF OUTBREAKS OF DISEASE IN
MACHAKOS DISTRICT DURING THE YEAR AND THE
THREE PREVIOUS YEARS

DISEASE	1931	1932	1933	1934
Rinderpest	5	8	5	6
Pleuro-pneumonia	—	—	—	—
Anthrax	1	1	—	—
Blackquarter	3	1	—	—
Ulcerative Lymphangitis ..	—	—	—	2

RETURNS FROM THE GOVERNMENT DIPPING STATIONS FOR THE LAST FOUR YEARS

STATION	EQUINES				CATTLE				SHEEP AND GOATS			
	1931	1932	1933	1934	1931	1932	1933	1934	1931	1932	1933	1934
Nakuru ..	41	230	438	592	1,826	6,750	2,179	1,783	29,570	33,817	40,066	25,921
Isiolo ..	134	29	98	89	—	—	—	—	69,851	68,160	41,716	57,718
Nanyuki ..	8	—	—	—	32,485	29,836	25,260	18,489	—	—	—	—
Rumuruti ..	—	—	—	21	4,831	12,772	9,768	2,003	384	122	—	—
Thomson's Falls ..	—	—	—	—	—	—	—	1,614	—	—	—	—
Naivasha ..	—	—	—	—	10,892	13,433	18,390	19,814	15,935	15,278	13,453	21,133
TOTALS ..	183	259	536	702	50,034	62,791	55,597	43,703	115,740	117,377	95,235	104,772

II—NATIVE AREAS.

EDUCATIONAL.

The educational system which was adopted some few years ago for native pastoral development, linked up with the administration of Veterinary Services, concentrating on the development of native pastoral resources, is essentially, a system of demonstration and propaganda.

Educational and demonstrational centres, known as African Training Centres, were established in certain native reserves, as facilities were available, at which tribesmen are received for a period of two years' training in disease control and animal husbandry. Each centre is staffed by a Veterinary Officer, who is also in charge of the veterinary activities of the native area in which the Centre is located, and by a Stock Instructor or Stock Inspector who has special training in disease control and native pastoral development.

It has not been possible, during the year, to add to the "African Training Centres" previously established as follows:—

Ngong, located in and serves the Masai Reserve.

Maseno, located in and serves the Central Kavirondo Reserve.

Machakos, located in and serves the Machakos-Kitui Reserves.

Sangalo, located in and serves the North Kavirondo Reserve.

Baraton, located in and serves the Nandi Reserve.

It has, in fact, been necessary for economical and other reasons to close the Isiolo African Training Centre which formerly served the Northern Frontier District.

It is hoped to complete the Centre at Mariakani to serve the Coast Province as soon as funds are available.

Herds of cattle are maintained at all these Centres and at some Centres flocks of sheep, which serve very useful purposes in respect of demonstrational and educational work for the benefit of the pupils: testing the productive capacity of the various types indigenous to the Colony, and selective breeding in the direction of better production.

Flocks of poultry are also maintained at certain centres for similar purposes, and for the distribution to poultry keepers in the reserves of birds of improved breeds.

Every endeavour is made to restrict pupilage to those who have obtained primary education certificates. It is, however, not always possible to obtain such pupils and in order that the Centres may deal with a number up to their full accommodation, pupils not in possession of the desired certificates, are selected and given elementary education to prepare them for their course of technical studies. It is expected that from the year 1935 onwards, post-primary pupils will be available each year up to the number of vacancies.

The total number of pupils accepted at all Centres during the year was 124, with a distribution as follows : Ngong Training Centre, 47 ; Maseno, 29 ; Machakos, 20 ; Sangalo, 12 ; Baraton, 16.

It is to be expected that the natives must, in time, be prepared to take a very much greater share in the control of disease amongst their herds and flocks, and in the production, preparation and marketing of stock products. To prepare natives for this purpose in the absence of other facilities, is the responsibility of the African Veterinary Training Centres.

Investigational work, on the productive capacity of the various breeds of native cattle under ordinary grazing condition, is discussed elsewhere in the report.

DEVELOPMENT.

It has been stated that native educational policy is directed along the line of pastoral development, and in this field there is vast scope for expansion. Much has already been achieved but very much more remains to be done. Stock and their products are valuable assets to the Colony but valuable only if the best economic use is made of them, and by this is implied, that the native population should have available an ample food supply in respect of meat and milk, that stock surplus to these requirements, should not be allowed to die from disease and starvation in vast numbers but should be converted into or required to produce some form or forms of marketable produce, and that land grazed by native herds and flocks should be conserved according to a recognized system and not left to become eroded and deteriorated as is too often the case.

The economics of native animal husbandry in regard to these various aspects are demonstrated at all African Training Centres through which hundreds of natives have already passed and it is scarcely too much to hope that impressions already

gained and to be gained in the future, will not lightly be set aside. In fact, even now, in the more progressive areas, many natives are enquiring into the best means of adapting modern methods of husbandry.

Local Native Councils continue to take a very practical interest in pastoral development and much of the work of that kind undertaken in the reserves is made possible by allocations from Local Native Council funds. This is particularly the case with regard to dairying, and hide shade-drying, equipment.

NATIVE MARKETS.

The establishment of recognized markets within the reserves has, and is, receiving every encouragement and attention. The type of market which appears to be most suitable is one embracing a dairy, butcher's shop, hide shade-drying shed, and slaughter arrangements. Such facilities are very valuable, convenient, and by concentration renders inspection and supervision comparatively simple. This system has been introduced into the Kavirondos and is particularly successful in Central Kavirondo where many of the larger markets on market days are hives of activity. Almost every form of native trade may be observed. There is incentive towards greater meat consumption and, incidentally, the hides of animals so slaughtered for immediate disposal, are prepared in a proper manner.

It is realized that the system is more particularly suited to densely populated areas but may be applied to a lesser extent, in other native areas, perhaps particularly at trading centres.

SURPLUS STOCK.

The question of surplus stock continues to be a problem. Some experiments were carried out last year in the conversion of Masai stock into fertilisers, etc., at the Nairobi Municipal By-Products Plant on a small scale, which resulted in some useful data being collected.

During the year, however, a scheme was evolved for the erection of a by-products plant in the neighbourhood of certain reserves in the Rift Valley Province and an application was made to the Colonial Development Fund for financial assistance.

The proposal is to deal with 10,000 head of cattle per year. This is a small number compared with available surplus, but would undoubtedly cause some relief in areas from which

supplies are to be obtained, and what is perhaps more important, would indicate, from experience gained, how far the idea could be extended to deal with the problem generally.

OVERSTOCKING.

Overstocking and surplus stock are closely allied, the latter very often leads to the former, which again leads to soil erosion. Severe mortality as a natural consequence of overstocking must from time to time be expected. The carrying capacity of a reserve or farm should be estimated on the head of stock which it can carry for a reasonable period, taking bad years with good, and not on acreage alone. The potential carrying capacity is an entirely different matter and might depend on the elimination of fly-belts, provision of water and other circumstances.

That heavy mortality has occurred in certain areas—the Masai Reserve for example—during the last few years and particularly last year, is unfortunately true and this all points to the fact that no reserves or areas should be permitted to graze any greater number of stock than they are capable of carrying.

The inevitable results of overstocking are not difficult to observe; mortality from starvation, stunted growth, emaciation and lowered resistance to disease—these are some of the evil results which affect the stock.

SOIL EROSION.

The damage to which overstocked land is exposed, must be regarded even in a more serious light, damage from which it may never recover, or only after a prolonged period of reclamation. Reclamatory measures are now being carried out in certain reserves, but because of expense, their scope must be exceedingly limited. They will, however, in addition serve to demonstrate to the tribesmen that land which has been ruined is difficult and expensive to reclaim and that prevention is the easiest course to adopt.

HIDES AND SKINS.

Within the native reserves the industrial activities of the Division are more particularly devoted to the development of the hide and skins trade, marketing, and the trade and marketing of milk products such as ghee and butter-fat.

The export figure for hides and skins during the year 1934, was £195,863 as compared with 1933 £159,324 and as compared with the year 1932 £117,124.

This expansion alone is most encouraging and is an obvious indication of the progress that has been made in the industry throughout the native reserves, more particularly in the Kavirondos. It will be of interest to explain here the ways and means by which this expansion has been brought about. Since it became known that shade-dried hides commanded a materially higher price than sun-dried hides in the export markets, it became a need, not only to encourage natives to produce shade-dried hides but also to teach them how to do so and to endeavour to make financial provision through Local Native Councils, or as otherwise available, for the erection of shade-drying hide sheds at the most suitable places in the most suitable reserves, and at the same time to discourage, as far as possible, the marketing of sun-dried hides. The sheds are staffed by trained natives employed by Local Native Councils, by the Division, and in some cases by natives working on their own initiative.

This scheme, as will be shown, is proving remarkably successful in the more thickly populated areas, especially in the areas concerned with mixed agricultural and stock farming, but less successful in the purely pastoral areas where the tribesmen are, from the very nature of their occupation, and mode of existence, far more conservative and less amenable to any departure in the line of trade or industry, from old established customs and traditions.

There are, for instance, nearly two hundred shade-drying sheds erected in the Kavirondos and the export of hides from these areas during the year was estimated at Sh. 859,561, a very appreciable increase over the figure for the last year.

This sum of Sh. 839,561 is in respect of exports from :—

Central Kavirondo, valued at ...	Sh. 366,980.
South Kavirondo, valued at ...	Sh. 217,498.
North Kavirondo, valued at ...	Sh. 205,720.

The above figures include prices for a small proportion of sun-dried hides but it is expected that next year greater figures will be reached as the shade-drying system expands.

Development of this kind is also proceeding in certain areas of the Central and Coast Provinces and, to a lesser extent, over all the native areas except the Northern Frontier and Turkana Districts.

Funds for the erection and equipment of hide shade-drying sheds are mostly supplied by Local Native Councils, while teaching and supervision is undertaken by officers of the department.

The Hides and Skins Rules under the Live Stock and Crop Production Ordinance which were applied during the year to Central Kavirondo, South Kavirondo and Machakos Reserves, should cause very much better progress in the output of shade-drying hides in the future.

Mombasa hides, the name by which Kenya hides are known to the trade, have a well-established place on the export market, but competition, as is the case with all other stock products, is keen, and to maintain or extend that place means that trade requirements must be met to the utmost extent. The better the product, the greater the demand, and to improve the general standard of the product, the greatest attention must continually be paid to flaying, preparation, shade-drying and grading. These matters are receiving close attention and it is hoped that by persistent supervision and propaganda, the natives will ultimately realize that hides cut in flaying, scored in preparation, mutilated by brands, and hides left too long before drying inducing putrefaction, must all be degraded, representing financial losses which could be avoided.

There is a small export trade in skins, but this branch of the industry has not received the attention it deserves, owing to limitation of staff and the necessity for concentration on the more important hide work, in order to endeavour to place that industry on a sound basis.

The report of the Imperial Institute Committee on Hides and Skins concerning experiments commenced a few years ago on the preparation of hides and skins, was received during the year and much appreciated by this Division.

NATIVE DAIRY INDUSTRY.

Ghee and Butter-Fat.

Many native areas are particularly suitable for ghee production; areas of high rainfall where there is adequate grazing during most months of the year.

The export figure for ghee for the year 1934 was :—

3,071 cwt. at a value of £8,472.

It will be observed that the export figure is not of very much consequence, but there is a very considerable internal trade and large quantities are annually imported from a neighbouring territory.

A few figures are shown indicating the output during the year from some of the most productive areas :—

DISTRICT	Quantity	Approximate Value
	<i>lb.</i>	<i>Sh.</i>
South Kavirondo	784,000	274,470
Central Kavirondo	257,160	97,435
North Kavirondo	62,920	23,840
Northern Frontier District and Tana River	46,697	26,803

Ghee production can be expanded very considerably and in areas suitable for the purpose, such expansion would constitute a profitable method of utilizing native cattle.

With any considerable expansion, however, it would be necessary to find additional markets and here again, as in the case of other products, an export market would tend to place the industry on a more secure basis.

For some years past export markets have been explored with the possibility of finding outlets and samples of well-prepared ghee of good quality were forwarded to the United Kingdom, various places in India, Ceylon and other likely markets.

Response from the United Kingdom was encouraging and an actual order for as much as 500 tons of ghee was received, but for various reasons, particularly in connection with grading and packing, it was necessary to defer the matter for further consideration. The response from other places was also generally encouraging and there appears to be no doubt that an export trade could be established, but this would require an organization to insure that markets once obtained could be maintained and market requirements in all respects fulfilled.

The system which encourages the manufacture of ghee is generally similar to that in operation for the preparation of hides and skins. Dairies are erected and equipped in suitable areas to which the natives may bring their milk in large or small quantities. The milk is separated, butter is made and converted into ghee and the ghee sold to the best advantage. In a few cases, native dairies were located convenient to the Lumbwa Creamery (Kenya Co-operative Creamery, Limited), butter-fat was sold to the Creamery, and although this trade

was at one time promising, it was later practically entirely abandoned as the financial returns compared unfavourably with returns from ghee manufacture.

The Local Native Councils usually finance dairy erection and equipment and the pay-out is generally on the co-operative system. Occasionally, enterprising natives erect, equip and operate dairies on their own initiative. In all cases, an attempt is made to fix a minimum price for milk in order that uniformity may be obtained. In almost all cases, dairies are staffed by natives trained in the African Training Centres. In South Kavirondo there are as many as 447 dairies, and in Central Kavirondo 130 dairies operated during the year. The number in North Kavirondo is 25. The Central Kavirondo Local Native Council, during the year, agreed to the introduction of a system whereby no native dairy be operated except under the conditions embodied in a permit to be issued by the Veterinary Officer of the District on behalf of the District Commissioner. The terms are printed in Swahili and require :—

- (a) that the holder is bound to produce ghee or cream not below standard.
- (b) that the dairy premises and utensils be kept clean.
- (c) that a dairy milk register showing names and amounts brought in by each supplier be kept in the dairy and be available at any time for inspection and checking.
- (d) that payment to milk suppliers be made in full promptly at the end of each month.

The price of milk was standardised for dairies in Central Kavirondo at 2 cents a pint, at which rate it was possible to produce ghee at Sh. 12/50 per tin of 40 lb.

In the same reserve, the appointment of two native Dairy Inspectors, paid for out of Local Native Council funds, has made it possible to devote to nearly seventy dairies the detailed attention required to raise the general standard of cleanliness and efficiency. The knowledge that they are assured of the minimum of 2 cents per pint of milk supplied, at the end of the month, has given to the milk producers confidence hitherto lacking. A substantial increase in the number of suppliers and the amount of ghee produced has followed the introduction of inspectors supported by the Dairying Rules.

During the year 1935, two additional native inspectors will be paid for out of Local Native Council funds, while the supervision of the more widely distributed dairies will, as in the past, be carried out by trained native veterinary staff.

Total production of ghee and butter-fat, during the year, in Central Kavirondo :—

				1933	1934		
Butterfat	..	..	<i>lb.</i>	48,013	39,551	17%	decrease.
Value	..	..	<i>Sh.</i>	28,545	18,610	31%	decrease.
Ghee	..	..	<i>lb.</i>	187,560	257,160	37%	increase.
Value	..	..	<i>Sh.</i>	79,263	97,435	21%	increase.
Total Ghee and Butterfat	<i>lb.</i>			235,573	296,700	26%	increase.
Total Value	..	..	<i>Sh.</i>	107,808	116,045	8%	increase.

The Kavirondos are thus the principal ghee-producing native areas of the Colony, but a certain amount of ghee is produced in the purely pastoral reserves during periods of milk surplus; it is only at such times that ghee production is encouraged in the pastoral areas. The ghee thus produced is usually made in the *manyattas* by the stock owners themselves and there is little or no supervision to insure quality and cleanliness. There are, however, other areas in which the rainfall and cattle population would justify dairy expansion; this could only be done by the provision of teaching and supervising staff, the availability of funds for the erection of buildings and equipment, and an intensive propaganda campaign to overcome the apathy of potential producers.

NATIVE CATTLE.

Census.

An exact census of the native cattle population of this Colony has not been made, although a census for particular areas has from time to time been compiled. The 1934 census was not extended to native areas, but according to the 1930 census the number of cattle in the possession of native owners was approximately 5,000,000 head. The mortality, however, since that time has been very severe due directly or indirectly to drought conditions so prevalent, particularly during the last few years.

Types.

The cattle are mostly of the Zebu type and vary in size and marking according to the areas of origin, and in a general way, they reflect in size and capacity many years of in-breeding, exposure to disease and storkage of grazing.

No attempt has been made to introduce extraneous breeds into the native areas, the native animal is considered to be more profitable, at the present stage of native development, because more resistant to prevailing diseases, more adaptable to severe climatic conditions, less affected by periodic shortage of

water and grazing, and native primitive methods of animal husbandry. By selective breeding, however, without the introduction of extraneous breeds, much improvement may be anticipated, long range work, which can only be carried out under existing circumstances, at such places as African Training Centres, under European direction. Selective breeding is proceeding at all African Training Centres, accurate and detailed records are kept, and it is hoped in time that young bulls of known records, will be available for service in native reserves, with the object of improving dairy production capacity.

Under ordinary circumstances, the milk yield of native cattle is low, the average is well under 200 gallons per lactation; a good cow may reach 250 gallons, whereas the exceptional animal may reach 350 to 450 gallons in a lactation period. The highest record figure was 469 gallons given by a native Boran cow at Ngong. On the other hand, the butter-fat content is high, rarely under 5 per cent, most usually from $5\frac{1}{2}$ per cent to 6 per cent and occasionally reaching 7 per cent or more. Milk records for native herds at African Training Centres are shown elsewhere in this report. The comparatively high milk yields, in exceptional cases, tend to show that the potential capacity of native cattle is reasonably good, and that it is worth while to attempt to raise the average by selective breeding.

The small size of the udder and teats is more or less characteristic of native cattle. Hand-milking however helps to improve these characters, but perhaps the greatest deterrent to udder development and milk yield, is the damage caused to the milk glands by tick infestations. These infestations commence at a very early age in the life of the animal and by the time the first lactation period is reached, the udder may be partially or completely destroyed. Dipping would, of course, overcome this difficulty but no provision has been made for the erection of cattle dipping tanks in any of the native reserves and, in fact, not a single such tank has been erected, with the result that in addition to udder destruction, mange and other skin parasitic diseases cause a good deal of damage to hides, as reflected in degrading on the export market.

Outside the native reserves, comparatively few native cattle are slaughtered for beef production, the figure given for the Nairobi Abattoir for the year 1934 was 10,264 head, the largest market in the Colony. It is impossible to estimate the number slaughtered for beef within the reserves, the figure

must be appreciable, but beyond these outlets and small outlets for transport and breeding stock for the settled areas, there is no market for native cattle.

NATIVE SHEEP AND GOATS.

As in the case of cattle no recent census has been made of the sheep and goat populations in the native reserves and native areas of the Colony, but the 1930 Census gives figures as follows : Sheep, 2,996,827 ; Goats, 4,321,543.

No economic use is made of these sheep and goats, except the small numbers absorbed for local meat requirements, the skins of which are utilized for native clothing, or exported. During the year under review, the export figure for sheep and goat skins reached 979,591 pieces valued at £26,091. The value of this export trade is small when compared with the number of animals available. That there is plenty of room for expansion, there can be no doubt, but as explained elsewhere, the hide industry must be the first consideration and as staff and time become available, more attention will be devoted to the preparation and marketing of skins.

The Northern Frontier District is by far the most important native sheep-breeding area in the Colony and produces a type of sheep very similar, if not identical, with the Black-head Persian. Some years ago, the export of sheep and goats from the Northern Frontier District was in the region of from 80,000 to 100,000 per annum ; the principal export was through Isiolo to the Kikuyu markets with a lesser number to the Coast Province via Lamu and a small number to Zanzibar. With the advent of more difficult times, and although prices dropped considerably, the Kikuyu natives were unable to purchase such large numbers, and the export decreased accordingly. During 1934, 57,860 sheep and goats were exported through Isiolo and 4,600 through Mkowe which is the quarantine station for Lamu. All sheep and goats which enter Isiolo from the Northern Frontier District are dipped at that station and are detained for observation, before permits are issued to destination, quarantine measures for the purpose of disease control. Most of the sheep are traded by licensed traders, who purchase at Isiolo or further north, but occasionally the tribesmen bring down flocks and trade themselves ; some of the more enterprising Kikuyu natives also take part in this trade. Practically all the sheep, after disposal in the Kikuyu markets, are slaughtered for meat, and although the Kikuyu themselves are sheep and goat owners, their flocks are not anything like sufficient to meet their food requirements.

The Masai district is also an extensive sheep-breeding area, supplying the Kikuyu markets in the neighbourhood of Nairobi, and the native markets in Nairobi. The export is mainly through Kijabe where the sheep are inspected, but not subjected to dipping, as is the case at Isiolo. Approximately 35,000 head passed through Kijabe during the year and 2,188 through Ngong.

Machakos and Kitui Reserves are additional large exporting areas, the sheep and goats from which are marketed in the Southern Kikuyu districts and Nairobi. As many as 37,235 sheep and goats were passed out from these reserves during the year.

Other exporting areas produce sheep and goats to a greater or less extent, and as has been shown, there is a lively trade in these animals throughout the Colony. It will be observed that the number of goats, according to census figures, is far in excess of the number of sheep; this is unfortunate, since goats are so destructive to pasture, particularly pasture otherwise overstocked. In any scheme for the reclamation of eroded and deteriorated areas, the goat problem will require particular attention, and there can be no doubt that in certain reserves some form of goat restriction is urgently required.

Little attempt has been made to improve native types of sheep and no attempt has been made to introduce woolled sheep into the native reserves. A few years ago, some work was commenced at Isiolo, in the direction of selective breeding of native sheep, but for various reasons this was abandoned. Small native flocks are, however, maintained at Ngong and Maseno and selected stud rams as available will be distributed for service in the reserves.

NATIVE POULTRY HUSBANDRY.

The pastoral tribes of the Colony, generally speaking, are not concerned with poultry husbandry and it is in the more highly populated areas that poultry breeding is practised to any extent. The most important breeding areas are the Kavirondo, Machakos, Kitui, Kikuyu, Nandi and parts of the Coast Province.

This industry, although an exceedingly promising one, has received little stimulation or encouragement other than the distribution of purebred cockerels bred at certain African Training Centres, to approved natives, from time to time. The Local Native Councils usually finance the purchase of parent birds

of improved breeds and either give a bloc grant which permits free distribution or distribution at a very small price. Many such birds have been distributed. The scheme is making slow but steady progress and already there is apparent in the areas of distribution a noticeable improvement in the size of eggs. The Rhode Island Red appears to be the breed most favoured and most suitable under the ordinary conditions of native poultry husbandry.

During the year some 860 chicks (Rhode Island Red) were hatched at Maseno Training Centre and 250 purebred Rhode Island Red cockerels and pullets were issued in the adjoining native reserves. From poultry centres in Machakos, 563 Rhode Island Red purebred birds were issued and 84 birds to village schools from the Machakos Training Centre. Baraton, for the Nandi Reserve, and Mariakani for the Coast Province, commenced poultry breeding during the year and will make distributions during 1935. Egg production in the native reserves of the Colony should be a profitable undertaking provided an export market can be obtained and the produce supplied in the form or forms required.

ANIMAL DISEASES—NATIVE RESERVES.

The more important diseases prevalent in native reserves and native areas were : Rinderpest, Contagious Bovine Pleuropneumonia, East Coast fever, Trypanosomiasis and Rabies in certain areas.

STAFF DISTRIBUTION IN NATIVE RESERVES DURING 1934

DISTRICT	IN CHARGE OF	
	Veterinary Officer	Stock Inspector
Central Kavirondo	1	1 (Maseno)
North Kavirondo	1	1 (Sangalo)
South Kavirondo	—	1
Machakos	1	1 (Machakos)
Masai District	1	2 (1 Ngong)
Samburu	1	2
East Suk	—	1
Kibigori	—	1
Isiolo	—	1
TOTAL ..	5	11

The Coast Province is staffed by one Veterinary Inspector and two Veterinary Assistants.

DISEASES—GENERAL.

The great prevalence of disease in the various native areas of the Colony constitutes perhaps the most important inhibitory influence on the development of the native pastoral industry. This influence is easily apparent to the observer in many ways, such as the difficulty of marketing native cattle, the ardent desire of the native to accumulate as many cattle as possible without any regard for quality, and the tendency of native cattle towards low productive capacity and slow maturity.

These important factors are all influenced directly or indirectly by the disease position.

Markets are restricted because it is necessary to attempt to insure that all cattle which leave native reserves are free from the major diseases such as Rinderpest, Contagious Bovine Pleuro-pneumonia, and East Coast fever in the case of cattle destined for certain areas. The native has learned from experience that when epidemics of disease appear amongst his cattle there is a greater chance of survival if his herd is numerous in the first instance. Quality does not enter into his reckoning. Low productive capacity and slow maturity are recognized characteristics of native cattle which in all probability are genetic factors and to these are added the constitutional disturbance caused by attacks of one or more febrile diseases. The physiological make-up must be well below par and inevitably be reflected in generations to follow.

Rinderpest.

This disease may be regarded as enzootic in all native reserves and native areas of the Colony, and during the year outbreaks were recorded in practically all such districts.

IMMUNIZATIONS AGAINST RINDERPEST IN NATIVE RESERVES

DISTRICT	Double Inocu- lations	Serum Alone	V.B. Tests	Vaccine Alone	Vaccine and Virus
Central Kavirondo ..	20,193	16	—	—	—
North Kavirondo ..	3,904	90	—	—	—
Kajiado	—	—	—	30,650	—
Lumbwa	3,384	446	—	—	—
Nandi	9,290	—	155	—	—
Elgeyo and Marakwet..	3,265	—	—	—	—
Timboroa	4,974	—	—	—	—
Isiolo	—	105	—	50	—
Coast Province ..	—	—	—	75	—
Samburu	—	—	—	32,425	—
Machakos	1,691	—	—	—	—
TOTAL ..	46,511	657	155	63,200	—

Total Immunisations, Native Reserves : 110,533.

It is the policy whenever possible and feasible, to treat outbreaks of rinderpest in native reserves by the simultaneous method, and thus to confer a permanent immunity which is indicated by the application of the A.M. brand. Where this is not possible, and in other areas in which extensive outbreaks occur and effort must be concentrated on immediate suppression, the vaccine alone method has been used, as in the case of the Masai and Samburu areas. In these latter areas, field Veterinary Officers are supplied with equipment for the preparation of vaccine in the field and as soon as an outbreak of rinderpest is reported, they are thus in a position to adopt control measures almost immediately. Vaccine so prepared has given very good results and can be made available at little cost and little loss of time. Vaccine makers are supplied free of charge by the tribesmen, and there is no charge for the vaccine.

The period of immunity conferred by field-prepared vaccine has not yet been definitely ascertained; in many cases however, the natives, realizing the value of the vaccine, deliberately expose their vaccinated cattle to rinderpest hoping that they may acquire a permanent immunity with little or no mortality.

In the Masai District approximately twenty-nine main outbreaks of rinderpest were recorded, and in South Kavirondo outbreaks were recorded in almost every location. Several outbreaks were reported in Samburu and outbreaks also occurred in South Kavirondo, Coast Province, Northern Frontier District, Nandi, Lumbwa and reserves in the Central and Rift Valley provinces.

A remarkable change has taken place in recent years in the attitude of the native towards rinderpest immunisation. It is now difficult, with the available staff, to satisfy all demands made for the service, whereas formerly it was necessary to prepare the way by intensive propaganda and any untoward incidents following inoculations resurrected suspicion and apathy.

Contagious Bovine Pleuro-pneumonia.

This disease, which unfortunately is very widespread in certain areas, has not a general distribution throughout the native reserves of the Colony, which position may be attributed to quarantine measures imposed.

The following areas remained in quarantine during the year: the Masai District, the Northern Frontier District, the Samburu Reserve, East Suk and Lumbwa Reserve, Njemps and the South Kavirondo Reserves.

In the Masai District, seven serious and several minor outbreaks occurred during the year and a total of 15,072 head of cattle were immunized, representing some 45,216 vaccinations, as each animal received three injections of vaccine. An attempt has been made to segregate all infected *manyattas* in a local quarantine area, but owing to the severe drought conditions it has been impossible to find any such place, with an ample grazing and water supply. The Masai generally are not adverse to this form of control, as they fully recognize the necessity for quarantine and they also appreciate the benefits to be gained by vaccinations.

In the Northern Frontier District the exact incidence of the disease is not known but it is known that the Marsabit District was extensively infected some little time ago. Infection in Samburu was very extensive; it was estimated that almost every *manyatta* was infected and it was necessary to place a special staff of one veterinary officer and two stock inspectors with native staff in that area to carry out a general inoculation campaign.

During the year approximately 50,000 vaccinations were completed in Samburu, but this work was interrupted by outbreaks of rinderpest which required urgent attention. Immunization consisted of two vaccinations, the first in the tail and the second behind the shoulder. A vaccine of a mild strain was used. The particular aim in this campaign is to immunize the young stock before exposure to infection. In the Churo area of East Suk, contagious Bovine Pleuro-pneumonia became very prevalent and here again it was necessary to provide a special staff to deal with the position. Some 1,762 head of cattle were vaccinated.

In the Lumbwa reserve, five locations in the Chepalungu forest were placed in quarantine during the year for Contagious Bovine Pleuro-pneumonia. Some 7,005 vaccinations were completed.

There is nothing to report from South Kavirondo.

East Coast Fever.

All native reserves in the Colony are recognized enzootic East Coast Fever areas with the exception of the Northern Frontier, West Suk and Turkana Districts. No form

of control is exercised other than the prohibition of the movement of cattle from enzootic areas to non-enzootic areas, except under certain conditions. There is, unfortunately, a considerable amount of illicit movement of this kind, which is responsible for disease extensions. In the enzootic areas few bovines escape East Coast Fever infection which is usually contracted at an early stage in the animal's life. There appears to be a higher state of resistance during calfhood, and it has been estimated that the mortality in infected calves is somewhere in the region of 60 per cent. The mortality in adults exposed to the infection is very much greater. A recovered animal is presumed to be immune and advantage is taken of this condition to use such animals for transport purposes, after they have been subjected to an immunity test and branded accordingly.

It has been amply demonstrated at African Training Centres, all of which are located in enzootic areas, that East Coast fever can, within a reasonable time, be eliminated by a regular system of dipping. This fact has seriously impressed the native, but at the present stage of development a general extension of dipping in the native reserves for the suppression of East Coast fever is neither practicable nor desirable.

Trypanosomiasis.

This disease has a fairly general distribution throughout the native reserves, in the lower altitudes of the Colony, encircling the highlands. It is well known to the natives who make every attempt to avoid tsetse belts, but in years of drought they are often obliged to penetrate these belts in search of grazing. It is then that mortality may become serious.

In the Coast Province numbers of cases were brought to notice during the year and whenever possible treatment with tartar emetic solution is attempted.

The most common Trypanosomes are apparently *T. Congolense* and *T. Vivax*.

The natives state that many areas formerly grazed by large numbers of cattle are now impossible as grazing grounds owing to "fly" extension.

The disease is also prevalent in the Northern Frontier District where extensive "fly" belts exist, particularly on the banks of the larger rivers.

In the Masai District, tsetse belts chiefly occur around the Southern Mara, the Southern Guaso Nyero and the Chyulu Hills and in times of drought the Masai are obliged to graze these areas and so Trypanosomiasis infection follows.

The Kavirondos are extensively infected, particularly the locations on the shores of Lake Nyanza, and in the region of the Nzoia and Yala Rivers.

Palliative treatment with tartar-emetic is much sought after by natives in Central Kavirondo and it is now impossible to meet all their demands. During the course of a few months, more than six hundred head of cattle received the full course of four injections but unfortunately most if not all of these animals were exposed to re-infection subsequent to treatment.

In South Kavirondo, cases of the disease, apparently contracted in the Lambwe valley, were brought to notice.

The southern portion of the Machakos Reserve, which borders the Athi River, is fly infested, comprising approximately one-eighth of the entire reserve. In this area there is an appreciable game population, and if freed from Trypanosomiasis, would be quite suitable for stock.

The districts of East Suk, West Suk, Kamasia and Turkana have considerable areas of "fly" belts.

It is considered that *Glossina pallidipes*, the common vector of animal Trypanosomiasis is the most widely spread of tsetse in the Colony.

Rabies.

In the native reserves only eleven cases of rabies were confirmed during the year, three of which occurred in Central Kavirondo and five in North Kavirondo. Throughout the year Central Kavirondo has been in quarantine for rabies, the three confirmed cases having occurred in North Gem, Nyakatch and South Ugenya Locations respectively. Some 23,400 poison baits distributed in North and South Gem, South Ugenya, Marama, Waholo and Wanga Locations resulted in a known mortality of 5,802 dogs, 356 jackals and 169 other carnivora. The situation in the north-western area of Central Kavirondo bordering on the Lake cannot be considered satisfactory until a thorough baiting of the entire area has been completed. The Maseno Quarantine Kennels were full to capacity during the greater part of the year. This service is intended to facilitate the movement of dogs from quarantine areas, to areas not so quarantined. In North Kavirondo, the five confirmed

cases occurred south of Kakamega or in that township. Several suspicious cases were also reported from districts south of the river Nzoia, and one case north of the river in the Marach Location. During the latter part of the year, poison baiting was carried out as intensively as possible, particular attention being paid to the area south of the Nzoia River and Kakamega township, as a result of which the known mortality was : dogs 3,115, jackals 602, and other animals 124.

No case of rabies was confirmed in the Nandi reserve during the year, although suspicious cases were reported.

The quarantine for rabies in the Lumbwa reserve was revoked during the year.

The position in South Kavirondo remains satisfactory. No positive or suspicious cases have been reported. The dog population of the reserve remains small but jackals appear to be increasing in numbers.

Other Diseases.

Anthrax and Blackquarter have been reported during the year and also tick-borne diseases. In the Kavirondos and other districts mange is becoming very serious and causes considerable damage to hides. Many other diseases of less importance have been reported.

Before concluding this report I wish to record my grateful appreciation of the good work carried out by my staff during the year, often under most trying circumstances, and the valuable help and assistance rendered by the Administration, Police, Game and other Departments.

H. H. BRASSEY-EDWARDS,
*Deputy Director (Animal Industry) and
Chief Veterinary Officer.*

INDEX

A		PAGE
Animal Diseases (<i>see</i> specific diseases).		
Anthrax		121, 145
B		
Beans		31, 64, 102, 110
Beeswax		85
Blackquarter		120
Board of Agriculture		17
Brands, Registration of		115
Butter		12, 132
C		
Cascara		65
Cashew Nuts		111
Cheese		13
Coco-nuts		110
Coffee		5, 37, 82, 84, 92
Coffee Board		18
Contagious Bovine Pleuro-Pneumonia		120, 141
Contagious Abortion		121
Contagious Nodular Vaginitis		122
Cool Stores		33
Cotton		8, 69, 83, 89, 111
Crop Estimates		11
D		
Dairying		12, 132
E		
East Coast Fever		119, 142
Eggs		16
Essential Oils		61
Extension Work		67
Exports		8
F		
Finance		1
Fodder Trees		79
Foot and Mouth Disease		121
G		
Ghee		14, 85, 132
Goats		137
Grading and Conditioning of Agricultural Products		7, 20, 26
Grasses		52
Groundnuts		91, 102

INDEX—Continued.

	PAGE
H	
Hides and Skins	17, 84, 130
I	
Inspection of Native Produce	75
K	
Kapok	94
L	
Land and Agricultural Bank	19
Legislation	20
Linseed	62
Live Stock, Importation	12
Lymphangitis	121
M	
Maize	6, 26, 46, 92, 110
Marketing	77, 102, 129
Millets	110
N	
Native Reserves, Agricultural Services in	68
Native Reserves, Veterinary Services in	127
Njahi	64
O	
Overstocking	129
P	
Pastures	52
Peas	63
Permit System	115
Pigs	16
Potatoes	31, 61
Poultry	16, 138
Publications	22
Pyrethrum	10, 61
Q	
Quarantines	117
R	
Rabies	122, 144
Rice	92, 110
Rinderpest	117, 140
Root Crops	60
Royal Agricultural and Horticultural Society of Kenya	18
S	
Santonin	65
Schools, Native Agricultural	80, 103
Seeds, Farms and Issues	72, 96, 112
Sheep	15, 137

INDEX—*Continued.***S—(Contd.)**

	PAGE
Silage	59
Simsim	91, 102
Sisal	6
Slaughter Stock	14
Soils	65, 77, 103, 130
Sorghums	110
Staff	23, 71, 88, 109, 115, 139
Sugar and Sugar Cane	10, 111
Swine Fever	121

T

Tea	8
Tobacco	94
Trees	74, 79, 85, 93
Trypanosomiasis	121, 143

V

Vegetables	93
-------------------	----

W

Wattle	10, 69, 76, 85
Weather Conditions	3, 36, 71, 89, 109
Wheat	7, 49, 93
Wormseed	65

